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Factors Influencing the Reduction of Maize Acreage on Swazi Nation Land

by

Vincent Majozi Sithole

A THESIS

SUBMITTED TO THE FACULTY OF GRADUATE STUDIES AND RESEARCH

IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE

OF Master of Science

IN

Agricultural Economics

Department of Rural Economy

EDMONTON, ALBERTA

Fall 1986

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The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies and Research, for acceptance, a thesis entitled Factors Influencing the Reduction of Maize Acreage on Swazi Nation Land submitted by Vincent Majozi Sithole in partial fulfilment of the requirements for the degree of Master of Science in Agricultural Economics.

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Date June 12th 1986

Abstract

To attain self-sufficiency in maize the Swaziland government uses, among other projects, the Rural Development Areas Programme on Swazi Nation Land (SNL). Farmers have adopted improved farming techniques, but have simultaneously decreased the area under maize production. Consequently the self-sufficiency objective targeted for 1983 has not been attained and appears remote as time goes on. The purpose of this research was to investigate the logic behind the decrease in area under maize.

A questionaire survey with 60 respondents was carried out on SNL in six maximum input Rural Development Areas. To supplement secondary data interviews were held with people in research institutions and the maize industry in Swaziland, Malawi and Zambia.

For the primary survey the sample was divided into two strata, commercial oriented and subsistence oriented farmers. Subsequent tests for differences using analysis of variance proved the two strata to be similar with respect to perception of security of land occupancy, change in area under maize, homestead membership size, and price of maize perception. The strata were found to be different only with respect to maize sales volume. The subsequent decision was to pool the two strata as one sample from the same population for the rest of the analysis.

Three hypotheses were tested using regression analysis. The first hypothesis was that farmers reduce area under maize because of insecurity of land occupancy. The second hypothesis was that farmers feel that the price of maize is relatively low thus producing for subsistence needs only while devoting released land to production of more remunerative crops. The third hypothesis was that there is a shortage of labour on SNL during the peak season demand due to rural-urban migration which is encouraged by the high opportunity cost of labour. A Z test of proportion was used to test the fourth hypothesis that farmers do not perceive a commercial market for maize to exist.

The results of statistical analysis showed that land occupancy was considered secure by farmers and thus has no influence on how much area to put under maize production. SNL

farmers feel that the price of maize is relatively low, there is no commercial market for maize, and there is a labour shortage during the peak season.

A major education and technological effort within the post production system is a prerequisiste. The maize import licence policy should be revised such that local maize is given priority over imports. The SMC's obligation to purchase all locally produced maize brought for sale should be enforced. More efforts to get urban unemployed people to move back to rural areas should be enforced.

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I would like to express my deepest gratitude to my family who sacrificed during my absence. I would like to dedicate this thesis to my mother, Miss Norah Mabuza and my grandmother, Mrs Mary (MRY) Mabuza.

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I. INTRODUCTION

The Swaziland government and foreign agencies have devoted a considerable amount of money and attention to projects aimed at increasing maize production by small farmers on Swazi Nation Land (SNL). Maize is the staple food of the Swazis. National maize self-sufficiency was targeted in the Third National Development Plan (1978/79-1982/83). To date this goal has not been achieved and actually appears more remote than ever (see Appendix D) despite a positive response by SNL farmers to improved technology. The uptake of hybrid maize, use of chemical fertilizer and use of tractors have exceeded expectations. Crop yields have increased substantially. The government expected these improvements to lead farmers into producing maize over and above subsistence needs. The surplus was expected to be produced for sale thus reducing the amount of imported maize and eventually leading to self-sufficiency.

Maize production remains insufficient for the country's population of about 600,000, increasing at about 3.5% per annum. Consequently maize imports have increased annually (see Appendix D). Imported maize comes from South Africa, with which Swaziland, along with Botswana and Lesotho have free trade as members of the Southern African Customs Union (SACU). This relationship between Swaziland and South Africa makes maize easy to import. The different levels of development between the two countries exacerbates the situation as it is to South Africa's interest to have a maize market for its maize surplus in Swaziland. This situation has made it difficult for the Swaziland government to enact a controlled maize import policy that is necessary if the self-sufficiency goal is to be realized.

With the majority of Swazi farmers being smallholders in SNL a self-sufficiency in maize requires that they produce maize beyond subsistence needs. However these farmers are not limited to one crop as the climate permits several cropping options. In their decision to produce maize for commercial purposes they consider the relative returns from the various crops. If they feel that there are less returns from maize relative to cotton, for example, they cannot be more induced by exhortation alone to produce maize for commercial purposes.

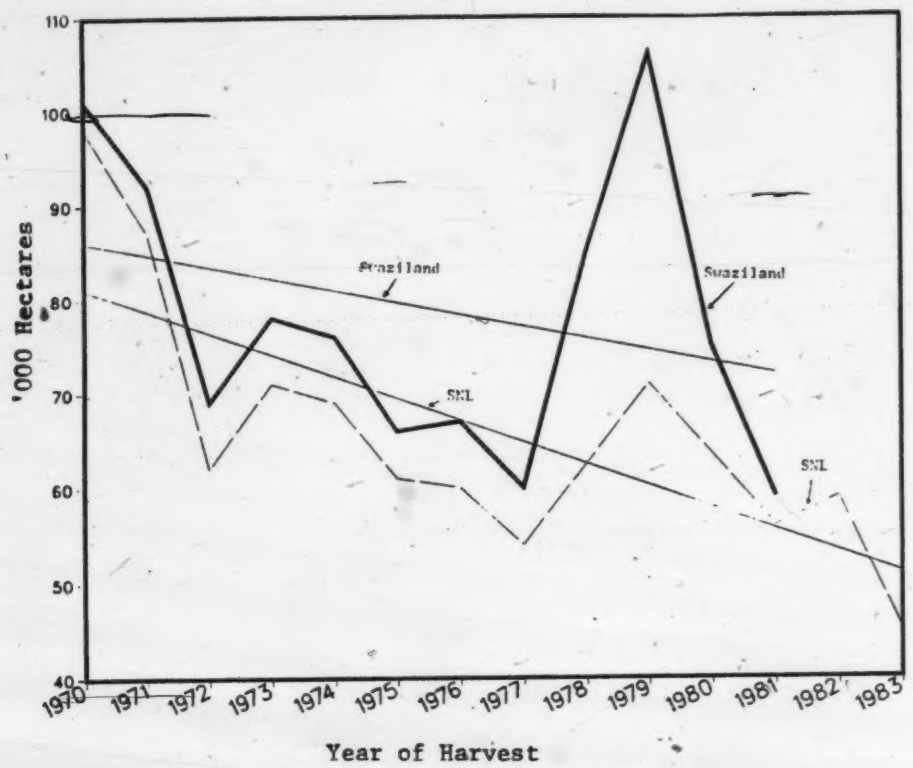
Producing maize for commercial purposes requires capital investment in land improvements and equipment. It may be argued that the traditional land tenure on SNL, with its entailed obligation to community and chief, is a deterrent to commercial production. SNL farmers also have off-farm employment options open to them. In allocatingng family labour among subsistence, commercial farm activities and off-farm activities cash income requirements are considered. If the returns found in wage employment are higher than returns from cash cropping labour may be released to work off-farm to increase family income. Deficiencies in marketing infrastructure can also impede commercial cropping.

The SNL maize producers' response to these external and internal circumstances has been to decrease area under maize as maize yield increases (see Figure I.1). The land that is released from maize production is used for growing other crops. Improved maize production technology within the current policy and economic situation appears to enable the acreage shift away from maize.

A. Purpose

The purpose of this research was to investigate the logic behind the reduction of area under maize production accompanying technological adoption. This study also examined the farming systems on SNL with emphasis on maize production and post production systems.

Figure 1.1 Area Seeded to Maize - Swaziland and SNL (1970-1983)



SOURCE: Ministry of Agriculture and Cooperatives, Review of the Rural Development Areas Programme, Huntings Technical Services Report, Final Report Annexes, October, 1983.

B. The Objective and Hypotheses

The objective of this research was to test four hypotheses which are purported to explain the reduction of area under maize production. These hypotheses to be discussed are listed here and will be developed in detail in chapter three.

1. SNL farmers perceive land tenure as insecure and only spend as much effort and time as is neccessary to produce enough for subsistence needs. Due to the adoption of high yielding varieties such needs can be met on less land. Thus the area under maize production is reduced.
2. There is not enough labour to work on the farm to meet the peak season requirements for labour on SNL. Rural-urban migration, encouraged by high opportunity cost of labour, has created a labour shortage on farms. Thus land under maize production has to be reduced so that the few available family workers can cope.
3. SNL farmers perceive maize producer prices to be relatively low. They confine production to subsistence needs, to enable production of other crops which are considered more remunerative than maize.
4. Farmers do not perceive a commercial market to exist for maize. As a result farmers do not consider maize as a commercial cash crop.

Investigation of these hypotheses will serve a larger national objective of involving the SNL farmers in the formal market. This part of the population accounts for 74% of the population of Swaziland and their economic future depends on taking part in economic development. According to Wortman and Cummings if the objective was only to produce certain maize tonnage, governments would have found helping large farmers a cheaper way to achieve self-sufficiency in food production. However this approach would leave the majority of farmers (small farmers) in difficulty or stagnating economically and this would certainly not promote rural development. This research examined the behaviour of SNL farmers pertaining to maize production.

C. Approach of Research

An understanding of farmers' problems requires that the current situation at the farmers' level be understood. The farming systems approach is one method of understanding the day to day operations at farm level. Shaner, Philipp and Schnehl have referred to farming systems as a complex arrangement of soils, water resources, crops, livestock, labour, and other resources and characteristics within an environmental setting that the farm family manages in accordance with its preferences, capabilities, and available technologies.[1] The systems approach avoids isolation of specific problems from other activities which, most of the time, have an influence on the problem's creation and solution. This research utilized the systems approach to understand the problem of farmers' not responding positively to the government's campaign to get them to produce maize for the market. The maize production and post production systems were also studied in detail. Statistical tests and regression analysis were used to test the hypotheses.

To pursue the objectives stated above both primary and secondary data were used. The instrument used to collect primary data was a questionaire survey carried out on SNL in six Maximum Input Rural Development Areas[2]. Farmers were visited in their homes and interviewed. Secondary data were obtained from the Social Sciences Research Unit (SSRU) of the University of Swaziland (UNISWA). Interviews with Central Cooperative Union (CCU), Swaziland Milling Company (SMC), Malkerns Research Station, UNISWA - Luyengo Campus, Rural Development Areas' (RDAs) Project Managers and Ministry of Agriculture and Cooperatives (MOAC) officials were held during the period of May-October 1985. Outside Swaziland secondary data were collected in Canada (libraries), Malawi (Ministry of Agriculture, and Finance, interviews with staff members in various ministries) and Zambia (Ministry of Agriculture, interviews with people in the maize industry).

---

[1]Shaner, W. W., Philipp, P. F. and Schmehl, W. R., **Farming Systems Research and Development: Guidelines for Developing Countries**, Westview Press, Boulder, 1982.
[2] Under the Rural Development Areas Programme (RDAP) Rural Development Areas (RDAs) are classified into Maximum input and Minimum input. More details on the classification is given in chapter II.

The Statistical Package for Social Scientists (*SPSSX*) was used for analysis. This package enabled crosstabulations and convenient use of statistical tests and regressionn analysis. The findings from the study are compared to previous studies and implications are pointed out.

D. Organization of the Thesis

This thesis is divided into six chapters. The first chapter has introduced the problem being studied and the objectives of the research.

The background on the country's maize industry is documented in the second chapter. The maize farming system and post production systems are reviewed. Information within this chapter comes mainly from published material, interviews held with people in; research institutions, the maize industry, Ministry of Agriculture and from the author's experience on SNL.

Literature is reviewed in the third chapter leading to the hypotheses being tested. Published material is the main source for this chapter.

The research methodology is given in detail in chapter four. The questionaire design, sampling method and pretesting of the questionaire is explained. The method used for testing the hypotheses is given in detail in this chapter.

Results of the survey are presented in chapter five. In this chapter the results of the hypotheses testing are presented and interpreted with discussion of their implications. Evidence from secondary data as well as some of the variables not used for the tests are analysed to put the results of the tests into perspective. The final chapter presents a summary, policy and research recommendations arising from the study.

II. MAIZE PRODUCTION AND POST PRODUCTION SYSTEMS

A. Agroclimatic Features of Maize Growing Areas

The country is divided into four administrative regions, Hhohho, Lubombo, Manzini and Shiselweni (see fig. II.1). The administrative headquarters for these regions are Mbabane, Siteki, Manzini and Nhlangano respectively. There are also four agro-ecological zones in the country; Highveld, Middleveld, Lowveld and Lubombo Plateau.

1. Highveld

This zone is 5200 square kilometres and is located from 1000 to 1800m above sea level.[1] The mountainous highveld covers 29% of the total land area and lies on the western side of the country. This region experiences a humid and temperate climate with rainfall in the range of 1000-1800mm. Only 3% of the total area of the region constitutes good arable land. Forestry is suited for this zone. The main non-renewable resource is asbestos, mined at Havelock mine.

2. Middleveld

Lying east of the highveld is the middleveld zone which covers an area of 4700 square kilometres.[2] It is generally hilly, and has several large valleys. Covering 26% of total land area this zone is located from 350-1000m in elevation. The climate is sub-humid with mainly summer rains falling in the range of 570-1200mm.

About 20% of upper middleveld has good to fair arable land. Only 10% of the lower middleveld can be classified as arable. This zone is the most developed and densely populated in the country. Agriculturally the middleveld is the most advanced with estate production of citrus fruits and pineapples as cash crops for export. Cotton, maize, tobacco and groundnuts are produced on SNL.

---

[1]Fourth National Development Plan, (forthcoming).
[2]Ibid.

Figure II.1 **The Map of Swaziland.**

3. Lowveld

This region lies east of the middleveld and has mainly undulating terrain.[1] It covers 37% of the total area of Swaziland. It is the largest region in the country covering 6200 square kilometres. It is located between 60-375m above sea level. It is characterized by dry climate andis notorious for drought. Rainfall ranges from 500 to 800mm.

About 12% of the western Lowveld has good arable land. The eastern Lowveld has about 30% of the area as good soil. In most years crop yields are poor and total crop failures are not unknown, especially of maize.

Over 4200 hectares is under irrigation. Sugar and citrus fruits are produced on large scale capital intensive technology. The country's only three sugar mills are located in this region. Coal deposits constitute the non-renewable resource base.

4. Lubombo Plateau

This region represents 8% of total area in Swaziland.[2] It covers 1300 square kilometres. The region borders with Mozambique. It is located at an average altitude of 600 metres.

The climate is similar to that of middleveld. About 12% of the region has good to fair arable soils. Rainfall lies in the range of 750-900mm.

The agricultural sector is dualistic. On one hand there are few large scale farmers who use modern farming methods and produce mainly for the market. On the other hand there are many small scale farmers who rely mainly on traditional farming methods and produce mainly for home consumption. A brief background on the land tenure system is appropriate at this juncture.

B. Land Tenure

When the British took control of the country, after the 1899-1902 Boer-War, their first task was to clarify the land ownership issue. [3] In 1907 a Land Proclamation Act was issued,

---

[1]Fourth National Plan, op. cit.
[2]Fourth National Plan, op. cit.
[3]The clarification was neccessary since the Swazis were of the impression that their King gave the settlers rights to graze, not to own any land. The tradition of the

under which the expatriate settlers obtained two thirds of the land leaving one third for the Swazis (see map on Appendix J). Swazis who found themselves on the alienated land were given five years to move, unless they made arrangements with the new landowners.

Land given to the settler was and still is operated under title deed holdings. Owners of individual tenure farms (ITF) or title deed land (TDL) are free to do anything with their land including buying and selling their land. Currently ITF consists of about 850 farmers with an average farm of 800 hectares. Due to mechanization and extensive use of modern farm inputs the ITF have relatively high yields. In 1982 the output from ITF accounted for about 60% of total agricultural output.[1]

Land that was given to the Swazi under the terms of the Land Proclamation Act is held under traditional tenure, herein referred to as Swazi Nation Land (SNL). SNL is held in trust by the King for the nation and is divided into chiefdoms for administrative purposes.[2] The chiefs allocate land to households to cultivate and to provide the home site. Unallocated land is open to communal grazing. About one tenth of SNL is allocated to individual families or homesteads. The rest consists of communal grazing areas, forests, mountains, swamps and river valleys. Every Swazi has the right to go to any area of his choice in the country and ask the local chief for land to settle his family.[3] Even new land that has since been included under SNL has been subjected to this type of allocation.

The decision of what crops and how much to grow is made by individual families within the constraints of area allocated and family labour available to work the land. Farmers are only pushed out by a chief if they commit serious crimes.[4] Farmers are expected to provide tribute labour for ploughing and planting, weeding and harvesting the chief's fields. As the King's

---

[3](cont'd) country, allowed individuals rights to graze livestock but not to own land as all *land belongs to the King*. On the other hand the settlers claimed ownership as they had paid for it (be it in dogs or other items).

[1]de Vletter, F., "Labour Migration and Agricultural Development in Swaziland", in: de Vletter, F. (ed), **Labour Migration and Agricultural Development in Southern Africa**, F. A. O., Rome, 1982.

[2]It has been estimated that 173 chiefs share SNL.

[3]He has to pay one cow or E100 to the chief.

[4] Included under this is practicing of witchcraft and activities that are a threat to the community.

representative the chief must ensure that family members partake in communal work, such as weeding and harvesting the King's fields.[1] 52.1% of community work and 39.5% of tribute labour is done by adult males. Adult females contribute 28.8% and 34.2% on these respective activities. [2]

Currently SNL covers 55% of total land area of Swaziland while TDL accounts for about 45%. The increase in SNL, from 1907's one third, has been due to the Lifa Fund (financed from a cattle levy), through Native Land Settlement (allowing eviction of settlers failing to utilize the land satisfactorily), through individual or company purchases by Swazis themselves.

SNL consists of about 45,000 farms averaging 2.75 hectares per farm.[3] SNL farms employ mainly family labour and use draught animals. Productivity per person day on SNL is low.

C. The Rural Development Areas Programme

The diagnosis of Swaziland's maize self-sufficiency problem identified the need for an agronomic transition for SNL farmers from subsistence to commercial farming. The Rural Development Areas Programme (RDAP), begun in 1970, aimed at stimulating the transition by introducing higher yielding varieties, timely imputs, better cropping practices and improved roads. The first phase (1970-76) included 11% of the rural population concentrated within four specific areas which covered 7% of SNL. This phase was financed by the United Kingdom and subsequently expanded in a second phase (1977-83) to include ten more Rural Development Areas (RDAs) (see map on Appendix K). These additional RDAs were funded jointly by the World Bank (IBRD), the African Development Bank (ADB), the European Development Fund (EDF) and United States Agency for International Development (USAID). The

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[1] Participation in such communal work is not restricted to SNL. TDL people also take part.
[2] de Vletter, F., Socio-Economic Survey of Swazi Nation Land, 1979.
[3] de Vletter, F., Labour Migration, op. cit.

Swaziland Government also contributed counterpart funds.[1] By 1982 the RDAP covered 26,566 homesteads or approximately 531,808 hectares involving 227,000 people.The goal of the government is to eventually bring all SNL into the programme.[2] Although 18 RDAs can be identified today, they are not homegenous.

RDAs are classified into two groups; maximum input and minimum input RDAs. Maximum input RDAs have more intensive farming systems, land development and improved social services than minimum input RDAs. [3] 10 maximum input RDAs and 8 minimum input RDAs are listed in table II.1. In 1980/81 the minimum input RDAs covered about 22% of the total SNL area while the maximum input RDAs covered about 34%.

Table II.1 **Rural Development Areas in Swaziland Classification - Maximum and Minimum Input - 1981.**

Maximum Input RDAs.	Minimum Input RDAs.
Northen RDA.	Bhekinkhosi-Mliba RDA.
Central RDA.	Hluthi RDA.
Mahlangatja RDA.	Sandleni-Luqolweni RDA.
Southern RDA.	Siphofaneni-Maphobeni RDA.
Mahlalini-Madulini RDA.	Sithobela-Madubeni RDA.
Ngwempisi RDA.	Nkambeni-Madlangempisi RDA.
Mayiwane-Herefords RDA.	Siphocosini-Motjane RDA.
Ebulandzeni RDA.	Masala-Vikizijula RDA
Lubombo-Mpholonjeni RDA.	
Mahamba-Zombodze RDA.	

SOURCE: The RDA Annual Report 1982.

The RDAP aims at increasing crop production and livestock production so as to raise the incomes and living standards of rural Swazi. As de Vletter[4] points out, this was to be

---

[1]For more information on the implementation which involves resettlement and community participation, a good job has been done by Levin, Magagula and Funnell.
[2]Simelane, E.B., in F.A.O., The Twenty Second Session - Fourteenth Plenary Meeting, 1983.
[3]Levin, R.M. Hegemony and Crisis: Swazi Royal Power In Transition, (unpublished Ph.D. Thesis), University of Liverpool, 1985.
[4]de Vletter, F., "A Socio-Economic Profile of Rural Swazi Homestead: A Summary of Findings From the Swaziland Rural Homestead Survey", op. cit.

achieved by the introduction of, inter alia:

1. Supply and use of crop inputs such as fertilizer and hybrid seeds.
2. Better husbandry methods.
3. Cash cropping.
4. Tractor hire schemes.
5. Range management and grazing control.
6. Introduction of improved livestock.

Through the provision of improved farm inputs and tractor pools at close proximity to farmers under the RDAP changes in the production and post production system are expected. Yields are expected to increase resulting in increases in production, while farmers cooperatives are expected to provide storages for inputs and also to assemble output for marketing purposes. The major national objective for the RDAP is the attainment of self sufficiency in food production, especially maize.

D. Farming Systems on SNL

Swazi family compositions vary from those with husband, wife and children to those with, in addition, married sons, daughters in-law and grand children residing in the same homestead. However the common factor among most homesteads is that they are male headed. This male head domination is dictated by the tradition that women's "access to land is formally indirect, through fathers, brothers, *sons* and husbands".[1] (*italics added*)

Women have influence on domestic affairs despite adult men being the ultimate symbols of authority in homesteads. "In most sub-Saharan countries, ... census statistics indicate that from two-fifths to over half of those economically active in agriculture are women."[2] There is also evidence of SNL female headed homesteads. Russell reports that in

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[1]Russell, M., The Rural Homestead in its Context, A Paper for Discussion, Research Paper No. 3, SSRU, Kwaluseni, 1982, p. 13.
[2] Safilios-Rothschild, C., "The Persistence of Women's Invisibility in Agriculture: Theoretical and Policy Lessons from Lesotho and Sierra Leone", in: **Economic Development and Cultural Change**. vol. 33, Number 2, pp. 299-317, January, 1985.

Kasoshunguse 12% of homesteads were headed by widows, 50% by resident male heads, and 38% by male heads away at work.[1]

Funnell and Testerink[2] found the mean size of households to be 8.62 persons. Of these 3.08 were resident adults and 1.32 absent male adults. Average resident members numbered 6.36.

Farms on SNL do not exhibit unique farming systems that can be identified by geographic location or area. In all regions most homesteads derive economic livelihood from three highly related enterprises; off-farm employment, livestock, and cropping. These activities are supplemented by small income generating activities, such as handicraft production (90.1% done by women) and beer brewing (94% done by women).[3] All family income is used to the benefit of all family members.

Off-farm employment is the stable source of income for SNL homesteads. De Vletter found that 81.9% of households have some member in paid employment, with an average of 2 persons per homestead.[4] Off-farm income provides cash for tuition fees, supplementary food, farm inputs, and other consumer demands. Young to middle aged men are the main labour involved in off-farm employment. There is a positive correlation between education levels and off-farm employment.[5] South African mines, local industrial and commercial enterprises are the main sources of wage employment. Although de Vletter found that only 5.4% of Swazi work force was in South Africa.[6] Russell notes that internal migrants are an increasing proportion of off-farm employees.[7]

The small size of the country and improved road networks enables off-farm employees to make frequent visits to the rural homesteads. Russell goes so far as to claim that Swaziland's

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[1]Russell, M., Boundaries and Structures in the Swaziland Homestead, Research Paper No. 6, SSRU, Kwaluseni, 1982.
[2]Testerink, J. and Funnell, D., The 1982-83 Sample Survey of Swazi Nation Land: A Review, SSRU, Kwaluseni, 1983.
[3]de Vletter, F., Socio-Economic Survey, op. cit.
[4]Ibid.
[5] de Vletter, F., Labour Migration, op. cit.
[6]de Vletter, F., Socio-Economic Survey, op. cit.
[7]Russell, M., The Rural Development Research Project: Some thoughts about the direction the project should take, SSRU/RDRP (unpublished paper).

internal migration is not realy migration at all but an oscillation between home and work. Contracts to work in South African mines are signed keeping in mind that labour will be demanded in the farm during the cropping season. The highly seasonal pattern of input requirement allows men to work off-farm in winter and return to the farm during the ploughing and planting season. Due to problems involved in employment and re-employment after an absence, many off-farm workers remit money for hiring labour instead of coming home. "Approximately 82% of SNL's homesteads have off-farm wage income, 67.6% have absentee workers, while 38.7% have homestead based wage workers."[1]

Livestock common on SNL farms are goats, poultry and cattle. Goats and poultry are used as a source of food. Cattle, the most valued livestock, serve a variety of functions. Socioculturally cattle are vital to ceremonies and social esteem. Economically they are a form of security[2] or store of wealth which can be drawn upon in case of emergency cash or food needs. Cattle perform a utilitarian function by providing milk, manure and draught power.

Cattle herding is done throughout the cropping season (i.e. October-May), mainly by boys and to a limited extent by men. Milking is done throughout the year and is both men's and boys' work. The importance laid on cattle has led to overstocking on SNL[3]. Livestock are grazed on communal grazing lands, with no grown or purchased fodder to supplement the natural forage.

Dryland multiple cropping is practised on SNL.[4] The main crop on SNL is maize involving 3/4 of cultivated land (see table II.2).[5] Maize is intercropped with pumpkins, or beans, or peanuts in all regions of the country. Even though the Lowveld climate is not suitable for maize production farmers still grow it as a subsistence crop. Other crops produced on SNL

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[1]Malkerns Research Station, Swziland Cropping System Research and Extension Training Project, Malkerns Research Station, 1983, p. 8.
[2]Under the SNL system only cattle is accepted as collateral for loans.
[3] For more details see, Doran, M. H., Low, A.R.C. and Kemp, R.L. "Cattle as a Store of Wealth in Swaziland: Implications for Livestock Development and Overgrazing in Eastern and Southern Africa", in: **American Journal of Agricultural Economics**, vol. 61, 1979, pp. 41-47
[4] Very few SNL farmers, such as Vuvulane farmers, have access to irrigation.
[5]de Vletter, F., op. cit.

Table II.2 **Areas and Proportions of Crops on SNL in 1982/83 Season in Swaziland (in hectares and percentages).**

Crop	Area (ha)	Proportion (%)
Maize	1.59	79.5
Tobacco	0.01	0.5
Cotton	0.22	11.0
Beans	0.04	2.0
Groundnuts	0.06	3.0
Peas	0.01	0.5
Sweet Potatoes	0.03	1.5
Others	0.04	2.0
Total	2.00	100.0

SOURCE: Ministry of Agriculture and Cooperatives, Review of the Rural Develpment Areas Programme, Huntings Technical Services Report, Final Report Annexes, October, 1983.

include groundnuts, cotton, tobacco, sorghum, mungbeans (*tinhlumaya*), sweet potatoes, cowpeas (*ludvonca*), and garden vegetables (under irrigation). The intensity with which these crops are grown varies with climatic zones. For instance 70% of cotton is produced in the Lowveld. Cotton, tobacco and garden vegetables are the major cash crops on SNL.

All ages and both sexes of family labour are involved in crop production activities though, at different intensities according to sex and age. The labour use pattern will be demonstrated at the interface of the maize production and post production subsystems explained below.

E. Maize Production Sub-system on SNL

Maize production activities on SNL include preploughing activities, ploughing, planting, insecticide application and weeding. The timing of each activity is distinct and the type of labour involved identifiable.

Preploughing preparations, carried out during the August-September period, involve cutting down shrubs and trees, and fencing. Burning shrubs and grass in between fields is also done during this period. During this period kraal manure is spread on the fields. Preploughing activities are dominated by men, but men's engagement in off-farm employment has drawn women and children into this work.

Dryland farming makes the timing of both ploughing and planting crucial to crop yields.[1] However the timing of ploughing and planting in SNL is determined by socio-economic conditions influencing farmers' behaviour collectively and individually. The chief has to tell farmers to resume looking after livestock to enable ploughing and planting to commence. Unlike farmers who rely on borrowed and/or hired ploughing and planting implements, a farmer who owns these will start cropping whenever he/she is ready.

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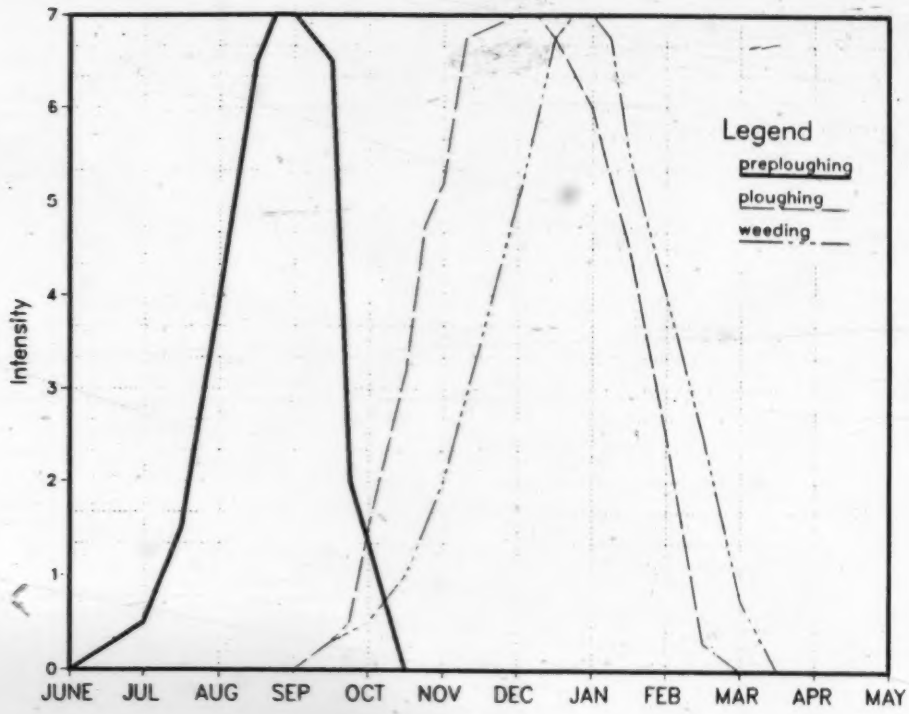
[1]For a detailed breakdown of influence of timing of field operations on yield, see Malkerns Research Station, op. cit.

Figure II.2 **Maize Production Activities According to Monthly intensity on SNL in Swaziland.**



Source: Adopted from: de Vletter, F., Subsistence Farmer, Cash Cropper or Consumer?:, op. cit.;
de Vletter, F., A Socio-Economic Profile of Rural Homestead:, op. cit;
Malkern Research Station, Swaziland Cropping Systems Research and Extension Training Project, op. cit;
Author's experience on SNL.

While ploughing and planting before October is not unknown on SNL, most farmers start ploughing and planting at the beginning of October. Due to the unpredictable pattern of rainfall farmers distribute their maize planting between October to end of January. This is rationalized on the experience that sometimes drought may not destroy early crops but the latter crops. In other years the reverse is true.[1]

The two sources of draught power for ploughing are tractors and oxen.[2] Use of a tractor for ploughing requires only one person. Use of oxen requires at least two people . Planting method and timing is influenced by the type of ploughing implement utilized. A typical SNL farmer, using a tractor, will plough once and then use a planter to plant maize. [3] A farmer using an oxen pulled plough has two options open to him; someone can follow the plough sowing maize seeds,[4] or finish ploughing and use a planter later. In the former case ploughing and planting are done simultaneously.[5] The former method requires at least three people to do both ploughing and planting. Both tractor pulled and oxen pulled planters require two people to operate.

Use of a planter enables the farmer to apply fertilizer (chemical and/or kraal manure)[6] while planting. When ploughing and planting are done simultaneously another person may be needed to follow the one sowing to apply fertilizer by hand with the seed. While this method is resource efficient in the sense that fertilizer does not get placed where there are no seeds, it is labour intensive, and is not commonly used on SNL.

Adult males do 40.7% of ploughing and 26.6% of planting. Adult females on the other hand, do 18.1% of ploughing and 34.5% of planting.[7]

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[1]Russell, M., Mbatha, N. and Sithole, V., Sample Survey of Maize Growing in Swaziland, SSRU, 1982.
[2] A very small proportion uses donkeys pulled ploughs, and hoes for ploughing.
[3] It is not unknown to find someone following a tractor sowing maize.
[4]Usually the person sowing will sow after every three trips made by the oxen, in order to leave space in between rows. This is a common method of planting.
[5]Gone are the days when seeds were broadcast over the field before ploughing and then covered up to geminate during ploughing.
[6]For kraal manure to be applied through a planter the farmer must sift into small particles.
[7]de Vletter, F. Socio-Economic Survey, op. cit.

It takes about seven days for maize to germinate from the day of planting. In three to six weeks after crop emergence weeding commences. Farmers who have cultivating machines (skoffels) cultivate before weeding with hoes. Weeding is done mainly by women in Swaziland. Use of herbicides is new and not widely used on SNL. Due to the timing of ploughing and planting weeding extends from November to February. Weeding is carried out predominantly by adult females, doing 48.7% of the work compared to adult males 4.8%, with the rest shared by all ages and sexes. [1]

While some farmers will weed maize more than once at its various stages of growth, most weed it once. Further weeding is recognized as contributing to higher yields. After weeding the crop is left to grow on its own until it ripens. Use of insecticides is expanding but it is not yet widely used. Most of the maize varieties sold in the country take about three months to mature.

F. Maize Post Production Sub-System on SNL

Maize post production activities involve field drying, harvesting, transportation from field to home, home drying, shelling and winnowing, home storage, pest control, farm processing, and consumption or sale. Division of labour for the various activities is by sex and age.

With the exception of maize consumed green, maize is left in the field to dry. Most farmers place greater emphasis on producing cereal maize for mealie meal. This is evidenced by the fact that while picking maize to be eaten green (***likwindla***) they pick the small cobbed maize and leave the big ones. Picking of green maize is done by women (using sickles) as they make the daily decisions of what is to be cooked.

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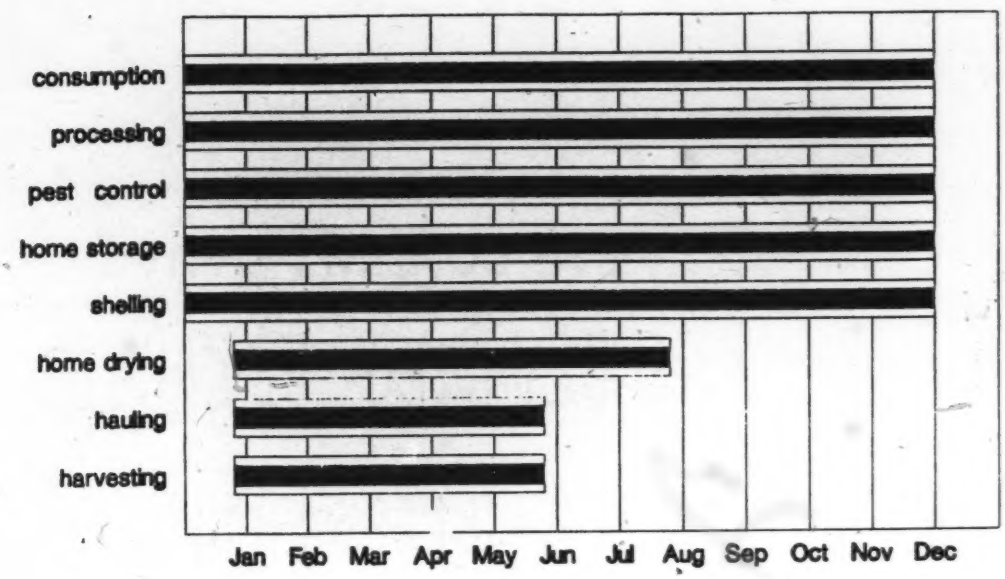
[1]de Vletter, F., op. cit.

Figure II.3 **Annual Maize Post Production Activities on SNL - By Time in Swaziland.**



Source: Adopted from: de Vletter, F., Subsistence Farmer, Cash Cropper or Consumer?:, op. cit.;
de Vletter, F., A Socio-Economic Profile of Rural Homestead:, op. cit;
Malkern Research Station, Swaziland Cropping Systems Research and Extension Training Project, op. cit;
Author's experience on SNL.

Maize harvesting is done during the April-May period. During harvest some maize is completely shucked while some (usually the big cobs) have the husks left hanging on the cob. Harvesting is done by hands. Adult females do 45.9% of harvesting compared to 4.4% by adult males.[1] Once maize is separated from the stalk it is piled and left to be hauled home. Harvesting is usually done by women on SNL.

Various alternatives are open to a farmer for hauling maize from the field to his home. Use of each depends on the size of the harvest and the farmer's financial and capital ownership. Farmers with big maize harvests sometimes use pick-up trucks or lorries (owned or hired) to transport maize home. Some use tractor pulled or oxen pulled wagons (owned or hired). The most common field transportation among ordinary farmers is oxen pulled carts. Use of wheel-barrows for field transaport, replacing head transport, has increased. Head transport by women is used on fields nearby the home site or when there is no other means of transport available. Women and children do most of the hauling.Once the maize has been taken from the field, livestock are allowed to graze on the maize stalk.

When the maize reaches home it is stored in two types of storage. It is put in a maize crib, which is open above, to enable complete drying, but well above ground to keep away from mice. The part of the harvest retained for seed, with the husks still hanging on the cob is tied together, bound and hung on a tree to dry. The replacement of traditional varieties by hybrid has reduced the need to use this type of storage.

No mechanical means other than sun and wind is used to dry the maize while in the crib. When maize has completely dried in June, shelling begins. Use of hands for shelling is common as few farmers have shelling machines. Shelling is mainly done by women and children. Maize is shelled at intervals according to household needs as it stores better on the cob. This method spreads shelling from June to the next harvest. After shelling maize is winnowed to remove chaff and stored. The cobs are either used for making fire or fed to livestock.

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[1]de Vletter, F., op. cit.

Various types of storage are found on SNL. Some farmers put shelled maize in sacks and keep it in their store rooms or kitchens. The traditional method of putting maize in pit storage is rare these days.[1] Some farmers put their shelled maize in metal drums. Metal tanks are increasingly used to replace all other methods on SNL.

The threats to maize on the field maize include weevil and mice. Once harvested, maize is still not safe from these pests. Weevils are transported from the field and originate in the crib. Mice are a threat depending on how the crib is made. Maize stored in pit storage is safe from the two without using any preventive method. Maize in a tank or drum is safe from mice but not necessarily safe from weevil. Farmers may apply pesticides to prevent weevil spoilage.

Some farmers do not use pest control measures. Consequently considerable maize is spoiled in the homestead. This loss is the reason farmers often sell maize immediately after harvest and later purchase maize to meet their needs.

Maize is taken from its storage and prepared for either consumption or sale. Processing maize for home consumption varies according to the way it will be consumed. Maize used to make porridge has to be taken to a grinding mill.[2] 67.7% of work involved in grinding mealies is done by adult females compared to 1.8% by adult males. Maize to be roasted (*imbasha*) needs no processing at all. The same applies to maize that will be boiled (*emancobo*) for consumption. 77.6% of cooking is done by adult females. Maize to be sold needs no preparation other than putting it in bags. 70.6% of selling produce is done by adult females compared to 17.5% by adult males.[3]

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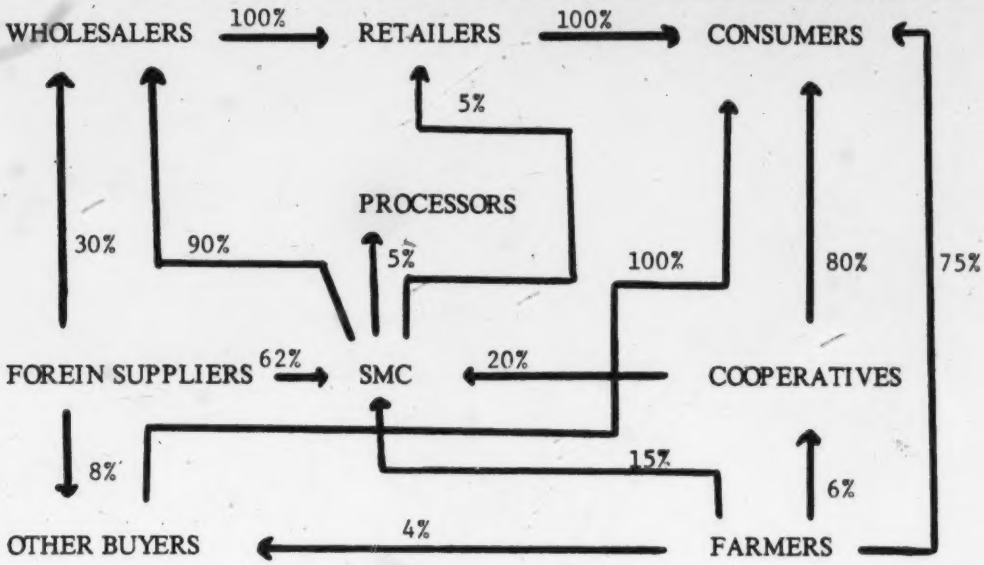
[1] A pit storage (*ingungu*) is dug in the cattle kraal and the bark of a tree is used as a lid to prevent water from flowing in to spoil the maize. Long ago such storages were built in the kraals because men used to stay next to the kraals so that in the event of armed attack they could protect both livestock and food at the same time.(By personal communication with the author's grandmother.)

[2] Some farmers have grinding mills which everyone has to pay to use according to the amount of maize ground. On the other hand some families have portable (labour intensive) maize grinding machines.

[3] de Vletter, F., Socio-Economic Survey, op. cit.

Figure II.4 **Schematic Representation of Maize Procurement and Distribution in Swaziland Showing Major Actors and Estimated Proportions in Percentages of Maize Movement, 1985.**



Processors include Breweries.

Other Buyers refers to estate plantations and companies in the country which either provide for free or sell maize products to employees.

SOURCE: Adapted, based upon observations and experience of the author, from F.A.O., Food Security Assistance Scheme: Report of the Food Security Policy Formulation and Project Identification Mission to Swaziland, Rome, 1981.

Maize Procurement Policy

The current commercial marketing policy places the responsibility on the farmer to contact the buyer. Selling to a formal market requires the farmer to bear the transport cost.

Various players can be identified in the procurement and distribution of maize in Swaziland. These are summarized in fig. II.3. A large proportion of produced maize on SNL is consumed at the farm. Surplus maize is sold to; consumers directly (75%), the SMC (15%), cooperatives (6%), and other buyers (4%). Cooperatives in turn sell maize directly to consumers (80%) and to SMC (20%).

Maize imports to the country come through SMC (62%), wholesalers (30%) and other buyers (8%). Details on maize import policy are given below. SMC distributes maize through three channels; wholesalers (90%), retailers (5%), and processors (5%). Wholesalers sell all maize to retailers who also sell all of it to consumers.

The SMC, acting as a government marketing agent, is committed to purchase all maize offered by local producers. When the farmer sells to the SMC or a cooperative he bears the transport costs. SMC collects maize from farmers in lots of not less than 30 bags so as to economize on transport costs. Such a requirement is often not met by SNL farmers unless they are able to sell their maize collectively. Cooperatives were established to assemble maize in addition to their other functions. So far they are not perfoming this assembly function effectively.

Sales within the informal market (directly to consumers and other buyers) account for a large proportion of maize sales from SNL. The burden of transport costs is shifted from the producer to the buyer under this system. Often the prices obtained by farmers is higher than that offered by the SMC. The problem with this outlet is that surplus producers may have to wait till the buyers start running down their stock before they can sell to them. Purchases are not in bulk and may be distributed over a long period of time, and so may be payment. Emergent farmers who have large surpluses to sell but still less than the 30 bags required by SMC often face the problem of liquidity being tied into the stocks, as neighbours purchase little

at a time over a long period.

Malawi and Zambian maize marketing experience is in sharp contrast to the Swaziland procurement policy. "In order that smallholder farmers (in Malawi) might dispose of their produce quickly and conveniently the Agricultural Development Marketing Corporation (ADMARC) maintains markets and main storage depots which are supplemented by seasonal produce buying centres."[1] These markets, in addition to buying crops, sell inputs and basic farm implements to smallholder farms. ADMARC has 100 storage depots throughout the country. In addition it operates 800 seasonal markets.[2] These markets are spaced so that no farmer has more than 8km to take his products to market.[3] The Agricultural Development and Marketing Corporation (ADMARC) controls these marketing outlets. The government is commited to purchase all maize brought by farmers. In times of liquidity problems or oversupply the policy is to reduce hours of service, rather than suspend purchases as is the case in Swaziland.[4]

Under Zambia's marketing system twelve parastatal and nine provincial cooperative unions play a dominant role, and in some cases, an exclusive role. Farmers sell to local unions. There are 500 - 600 buying points throughout the country. No producer is reported to be more than 20km from delivery point.[5] The grain is stored at district level or sold to the National Agricultural Marketing Board (NAMBOARD). From the unions it may be sold directly to processors (stockfeed, or beer industries). NAMBOARD has two types of storage: national (storage to meet national emergencies) and provincial storage. From both types of storage maize is taken to processing industries.[6] A computer is used to monitor NAMBOARD's stock

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[1]Southern African Development Coordination Conference, Projects for Achieving Regional Food Security, Project No. 8, Regional Food Marketing Infrastructure, Final Report, Vol. II, Agrodev Canada, Inc., March 1983.
[2]Ibid.
[3] Personal communication with Mr. Mponela, Principal Economist in Ministry of Finance (August 6th, 1985).
[4]Personal communication with Mr. M. M. Z. Njolwa (Chief Project Officer), Mr. R. Kaunta (Principal Economist), Mr. K.M. Mtawali (Principal Economist) and Mr. S. S. Banda (Serior Economist) in the Planning Division of the Ministry of Agriculture (August 8th, 1985).
[5]Southern African Development Coordination Conference, op. cit.
[6]Planning Division., Estimated Costs of Production of Major Crops in Zambia,

of grain in all depots on a weekly basis. About 60-65% of maize in Zambia is marketed through formal marketing institutions, indicating that maize has become more of a cash crop than just a subsistence crop.[1]

Maize Pricing Policy

The maize price policy operating in Swaziland is one of "providing a guaranteed floor price for maize of minimum *acceptable* quality and a ceiling price for selected *maize* products for consumers".[2](*italics added*) Under the Control of Cereals Act No. 28 of 1959 the Minister of Agriculture and Cooperatives announces yearly the maximum retail prices at which Grade I (sifted) and Grade II (unsifted) maize meal will be sold within the country. In the same gazette the Minister announces the minimum price payable to producers in Swaziland.

Maize is the only crop in Swaziland where the government sets the minimum prices. Farmers are not obliged to sell at these specified minimum prices. They are also not forced to sell to any specific market outlet. By setting the minimum price and specifying the markets where such prices prevail farmers are provided a guaranteed market outlet. Controlling the price of maize meal through the control of milling, wholesale and retail margins ensures that consumers are protected from monopoly pricing of handling, milling and distribution services in the post production system.

The Swaziland government cannot set local maize prices in isolation. Its ability to increase or decrease prices is constrained by prevailing prices in the Republic of South Africa because of the Southern African Customs Union. Any large price differential between the two countries leads to cross border transfers.

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[1](cont'd) Ministry of Agriculture, 1985.
[1]World Bank, Zambia Agricultural Pricing and Parastatal Perfomance Study,, March 29, 1985.
[2]F.A.O., Food Security Assistance Scheme: Report of the Food Security Policy Formulation and Project Identification Mission to Swaziland, Rome, 1981, p. 52.

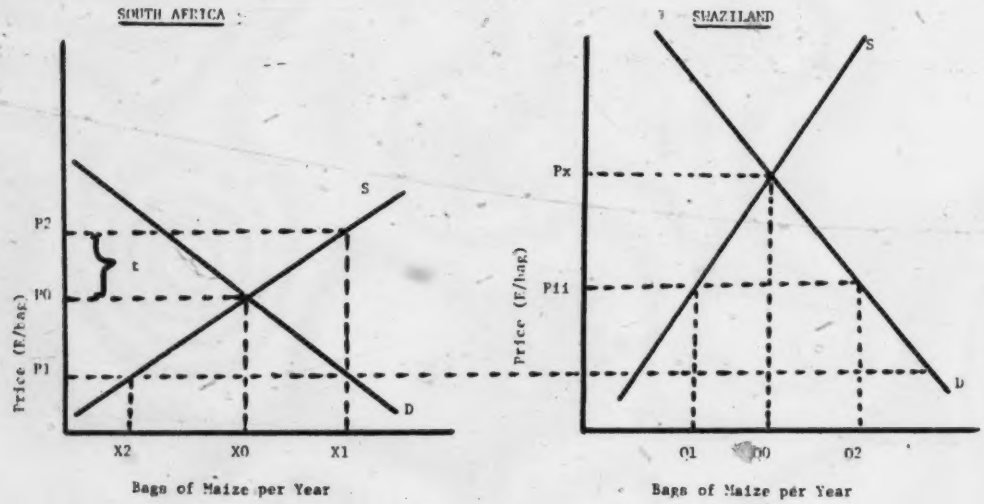
Table II.3 **Comparative Data on Maize Prices - South Africa and Swaziland (Rands (R) per tonne and Emalangeni (E) per tonne) (1969/70-1982/83)**

Year	South Africa (R/t)	S.A. + Subsidy (R/t)	Swaziland (E/t)
1969/70	-----	-----	40.20
1970/71	-----	-----	42.40
1971/72	42.54	37.37	42.40
1972/73	39.84	34.60	42.40
1973/74	52.32	45.50	43.30
1974/75	57.10	50.00	44.10
1975/76	67.35	56.00	61.00
1976/77	77.30	65.00	75.60
1977/78	84.07	73.60	80.00
1978/79	90.45	79.95	89.90
1979/80	111.75	100.15	106.00
1980/81	130.75	118.25	122.10
1981/82	133.00	118.25	134.28
1982/83	------	134.05	156.85
1983/84	------	167.55	176.45

---- data not available.

SOURCE: Maize Board (RSA) Annual Reports, SMC, and the Economic Planning Analysis Section, Ministry of Agriculture and Cooperatives.

Figure II.5 **Theoretical Demonstration of the Influence of Price Subsidy on South African and Swaziland Maize Production.**



Until 1985 the producer price of maize in Swaziland was based on the import parity prices of maize at the mill site in Manzini. The local cost of bags, the local transport costs and a small cooperative handling fee were deducted from the import parity price to arrive at the SMC farm-gate bid price. It has been reported that in general the announced maize prices have been marginally above those in South Africa " providing local producers with an added incentive to increase production."[1] But the element of subsidy in South African prices and the differences in production costs between South African farmers (large scale) and SNL farmers (small scale) results in low returns to Swazi maize farmers. Swazi consumers, however, benefit from the South African maize subsidies..

Although it is often argued that Swaziland's maize prices are higher than South Africa's prices, data on table II.3 show that in effect what the South African farmer gets is higher. For instance, while the South African price was R56 per tonne in 1975/76 compared to Swaziland's E61, the actual price, including subsidy, obtained by the South African farmer was R67.35 per tonne. On the surface it looks as though the South African farm gate price is lower when in actual fact it is higher.

The subsidy element in South Africa's producer price presents a picture similar to the theoretical one on Fig. II.4.[2]

At the point of intersection of maize supply S and demand D in South Africa on Fig. II.4, the price is P0 and the quantity demanded per year is X0. Due to the South African deficiency payment policy farmers are paid t rands per bag of maize as indicated on Fig. II.4. These payments increase the effective price received by farmers to P2. At the price P2 South African farmers increase production, as shown by the movement along the supply curve, from X0 to X1. At this level of supply market prices are pushed down to P1.

On the other hand in Swaziland the market clearing price is Px. However the country's price policy is such that the price to Swazi farmers is Pii. Pii is equivalent to P1 in South Africa

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[1] F.A.O. op. cit. p. 54.
[2] Tomek, W.G. and Robinson, K.L., **Agricultural Product Prices**, 2nd edition, Cornell University Press, Ithaca, 1981.

plus transport, handling and storage costs. At the price Pii Swazi farmers reduce production from Q0 to Q2. At this level there is excess demand (Q2 - Q1). This gap is filled by imports from South Africa.

From the diagram it is clear that for Swaziland to be self-sufficient in maize Px is the price that farmers have to get. But if marketing agents can buy maize from South Africa at P1 then they will not purchase Swaziland's maize at such a high price. This indicates that an import parity price policy in Swaziland can not be effective in encouraging adequate acreage to ensure self-sufficiency. A deficiency payment system in Swaziland could resolve the problem.

Consumer maize meal prices are calculated using the into-mill price for maize and adding a milling margin, handling, transport, wholesale and retail margin. "The milling margin used in the calculation for Swaziland is based on the average margin for all maize mills as calculated by the South African Maize Millers Association."[1] The producer price for maize is set by the government at import parity based on the selling prices of South African Board's producer price. This price is based on production costs of large scale commercial producers in South Africa and on the South African government's concept of a "desired consumer price" which is heavily subsidized.

Unlike Malawi and Zambia where prices are announced before planting, in Swaziland they are announced once a year on the 1st May, after harvest. Only in 1984 were prices changed during the year after the May announcement. This change was necessitated by unexpected increases in fuel prices. Price had to be increased as transport costs increased the *cif* Manzini cost of imported maize.

In 1985 prices were set differently to the normal practice. An interview with government officials in the Ministry of Agriculture and Cooperatives revealed that for the first time in recent years a domestic inflation element was introduced into price setting. The technical side of the adjustment was not revealed though it seems that inflation was added to the *cif* Manzini cost of imported maize, such that the 1985 price is higher than it would have

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[1]F.A.O., op. cit. p. 54.

been by the inflation rate. This method increases the margin to the producer, shifting the burden of inflation from the farmer and miller to the consumer.

The main instruments used to pass price information to farmers and consumers are radios and newspapers.[1] While the distribution of radios among SNL families is widespread, newspaper distribution is centred around urban areas. Many farmers can not read English. Price announcements over the radio and within newspapers are published once. Consequently many farmers never get to know maize prices.

Maize Import Licencing

All maize imports into Swaziland are undertaken under licences issued by the Ministry of Agriculture and Cooperatives. "Maize distribution is in the hands of private enterprise and any organization is able to apply to the Ministry of Agriculture and Cooperatives for a licence to import maize or maize products."[2]

In 1981 it was found that the SMC still accounted for 62% of maize imports. A further 30% of imports is handled by four other wholesale companies operating in Swaziland - Darkton Store, Swaziland Food Distributors, Swaziland Food and Chemical, and Swaziland Wholesalers.[3]

The government does not have a well defined policy for issuing maize import licences. In principle "import licences are not given liberally but only when a need is identified and where SMC is unable to adequately meet the applicant's needs".[4] In practise, however, such is not the case. The last two years have shown that some wholesalers were importing maize and maize products while SMC had adequate stocks to meet the domestic demand.

The government's lack of committment to limit the number of import licences can be explained by two factors. Swaziland is a member of the Southern African Customs Union (SACU). A large proportion of government revenue comes from SACU (see Appendix E).

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[1]There are three daily newspapers (one in SiSwati and two in English).
[2]F.A.O. op. cit. p. 60.
[3]F.A.O., op. cit.
[4] Ibid. p. 60.

This makes it hard for the government to restrict maize imports to the extent that the self-sufficiency policy would require. The economic power of South Africa is felt in Swaziland and this may explain the officially unexplained lifting of SMC's monopoly of importing maize and maize products in 1976. The other factor is that South African maize can be obtained in bulk with almost risk-free quality by SMC and wholesalers. The country takes advantage of the South African subsidies. This gives imported maize both a convenience and price edge over local maize which has to be collected all over the country in small amounts and at often poor quality.

The maize import policy has resulted in storage problems for SMC. Wholesalers were importing maize and maize products while SMC storage was full. During the 1983/84 and 1984/85 cropping seasons SMC suspended local purchases when its storage was full, while other maize importers continued to bring in maize (see Appendix D). Farmers who had travelled long distances with maize for sale were turned back, reinforcing farmers' doubts about maize as a cash crop.

The situation in Malawi is such that only ADMARC has the licence to import maize and maize products when local production does not satisfy local needs. NAMBOARD has a similar import monopoly in Zambia.[1]

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[1]Southern African Coordination Conference, op. cit.

III. LITERATURE REVIEW

A. Introduction

This chapter presents a review of the theoretical bases for the hypotheses tested by this research. The various hypotheses are put forward to explain the behaviour of SNL farmers in determining their maize area. Despite the policy to promote maize self-sufficiency, the area under maize is declining with the adoption of high yielding technologies. This has resulted in a continuous increase in maize imports and failure to achieve the self-sufficiency objective.

Among the possible hypotheses, one is that the land tenure system is not conducive to farmers' investing in capital improvements required for commercial maize production on their farms. It may be argued that when farmers feel insecure about their tenure they are less likely to invest in improvements beyond those needed to provide for subsistence needs.

Another hypothesis argues that the declining area may be due to labour shortages during the peak farming season. Labour shortage is blamed on off-farm migration. Remaining members of the farm family tend to till only an area of land that they can afford to work on.

Farmers are faced with cropping options. But the decision to grow a particular crop such as maize for cash purposes is largely influenced by its relative price compared to other crops. If the price of maize is considered to be lower relative to that of cotton a farmer will take up cotton production for commercial purposes while growing maize only for subsistence needs.

It may also be argued that deficiencies in marketing infrastructure cause farmers to overlook commercial market opportunities. When a commercial market is not perceived to exist there is little incentive to produce for a market.

This chapter proceeds to establish the theoretical bases for these hypotheses. A brief historical background of the theories of economic development is presented first. This section also explores the transition of agriculture's passive role in economic development to that of a leading sector.

Section C in the chapter examines the theory behind land security hypothesis. The main emphasis is on land tenure characteristics common in Africa. In this section customary land tenure or the communal land system and individualization of land ownership are compared and contrasted. The effects of land reform are briefly discussed.

Section D discusses the hypothesis that the reduced acreage under maize production is due to a shortage of labour at peak farming seasons. This section examines briefly the causes and effects of rural-urban migration.

Lack of a commercial market perception is discussed in section E. The various influences to farmers' perception of the existence and non-existence of markets are examined in this section.

Supply response is briefly reviewed under the sub-topic of price incentives in section F. The literature review on this issue is based mainly on empirical studies.

B. Historical Perspective of Economic Development Theory

From as early as 1949 Prebisch [1] and Singer[2] independently pointed out the existence of secular tendency for terms of trade to turn against countries that exported primary products and import manufactured goods. This led development economists to conclude that growth through agricultural and primary exports was limited. Consequently import substitution industries were given the priority. The tendency to downplay agriculture was reinforced.

In 1958 Hirschman's theory of backward and forward linkages argued that government investment should be concentrated in activities where the linkage effects were greatest since this would maximize indigenous investment in related, or "linked" industries. Agriculture lacked direct stimulus to setting up industries through linkage effects. The superiority of manufacturing in this respect is accepted.

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[1]Prebisch, R., "Commercial Policy in the Underdeveloped Countries", in: **American Economic Review**,vol. 64(May) pp. 251-73, 1959.
[2]Singer, H., **International Development: Growth and Change**, McGraw-Hill, New York, 1965.

Lewis' dual sector growth model showed that "if food supplies to the modern sector do not keep up with modern sector's demand for labour, the modern sector will have to consume a larger share of its output in feeding its labour force, and this will leave a small surplus for capital accumulation".[1] From Lewis' model some economists began to point out the interdependence between agriculture and industrial growth. In 1961 Jorgenson [2] argued that growth in urban employment depended on the rate of growth of the agricultural surplus. Jorgenson, Ranis and Fei,[3] and Enke[4] later showed that food shortages could choke off growth in the non-farm sector. If the remaining labour in the farm sector could not produce enough food to meet the demand in the non-farm sector then food prices would rise, resulting in relatively low savings, thus negatively affecting investment. These authors argued for investment in the agricultural sector to take place in order to avoid economic stagnation at early stages of development.

Later on agricultural economists such as Johnston and Mellor[5] stressed the importance of agriculture as a force in economic growth. They pointed out that agriculture could make five important contributions, which Kuznets[6] summarizes as the "market contribution" and the "factor contribution", to the structural transformation of developing economies:

1. it could provide labour;
2. it could provide capital;
3. it could provide foreign exchange;
4. it could provide food for a growing industrial sector;
5. it could supply a market for domestically produced industrial goods.

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[1]Meier, G. M., **Leading Issues in Economic Development**, 4th edition, Oxford University Press, New York, 1984, pp. 427-428.
[2]Jorgenson, D.W., "The Development of Dual Economy", in: **Economic Journal**, vol. 71(June) pp. 309-34, 1961.
[3]Ranis, G. and Feir, J.C.H., "A Theory of Economic Development", in: **American Economic Review**, 5(4), pp. 533-65, 1961.
[4]Enke, S., "Economic Development With Limited And Unlimited Supplies Of Labour", in: **Oxford Economic Papers**, vol. 14(June) pp. 158-72, 1962.
[5]Johnston, B.F. and Mellor, J.W., "The Role of Agriculture in Economic Development", in: **American Economic Review**, September, 1961.
[6] Kuznets, S., **Economic Growth and Structure**, New York, 1965.

Capital was transfered from developed countries to developing countries. When extension programs failed to achieve rapid increases in agricultural output there had to be a re-evaluation. This led to arguments for research to be done in developing countries and investment on human capital by Schultz in his book Transforming Traditional Agriculture in 1964.

In developed countries, where the process of economic and social integration between agriculture and other sectors of the economy is advanced, farming is a business and farmers behave like businessmen.[1] Such farmers are commercially oriented. They are also technically oriented. It is sometimes said that despite the image of poverty which their political representatives have a vested interest in projecting, most of these farmers are not worse off than people in other forms of occupations.

In developing countries the agricultural sector exists with the modern sector. The latter sector is smaller in terms of employment but in terms of production for the marketed output it is much larger. The agricultural sector is greater in terms of employment but smaller in terms of marketed output. This is what economists have termed "economic dualism".[2]

Within the agricultural sector itself, in many developing countries, one encounters two types of farmers. There is a small group of large scale farmers who are highly mechanized and produce mainly for the market. One might consider this group of farmers to behave like farmers in developed countries in various aspects. The large group consists of what can be called traditional farmers. Production by traditional farmers is usually for subsistence needs and family labour is the main source of farm work-force. Such farmers sell unexpected or unplanned surpluses over and above subsistence needs and hedge against crop failures in following years. We might note at this point the presence of farmers who definitely produce for the market, as evidenced by their production, in some of of their fields, of non-food cash crops.

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[1]Ghatak, S. and Ingersent, K., **Agriculture and Economic Development**, The Johns Hopkins University Press, Baltimore, 1984.
[2]Eicher, C.K. and Staatz, J.M., (eds.) **Agricultural Development in the Third World**, The Johns hopkins University Press, Baltimore, 1984.

As mentioned earlier, the agricultural sector has to produce over and above the needs of rural sector in order to supply food and raw material for the urban sector. The task faced by development planners is to find out why the majority of farmers (traditional farmers) do not produce mainly for the market. Information about the farmers' behaviour is very essential in understanding the source of the problem and in attaining a solution. Though lumped together as traditional farmers, their behaviour will vary from country to country, or even within a country from region to region, thus requiring different solutions. The economist's task is to find the logic behind the lack of interest on the farmer to produce for the market, in order to come up with effective solutions.

Various explanations and hypotheses have been documented in response to such a problem The following sections are about four such hypotheses, which were tested in this research.

C. Land Tenure

Land tenure deals with the conditions under which people hold and occupy land. People visualize certain norms or goals toward which they strive, and want the tenure system to help them get there. According to Schickele[1] farmers want tenure conditions that will help promote among other things the following:

1. their freedom to manage and exercise their capacities and efforts to the benefit of their families;
2. incomes that are enough to sustain acceptable standards of living;
3. wide dispersion of land ownership among farmers to safeguard managerial freedom, social status, and entrepreneurial opportunities for the many;
4. security of land occupancy.

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[1]Schickele, R., "Theories Concerning Land Tenure", in: Halcrow, H.G.,(ed) **Contemporary Readings in Agricultural Economics**, Prentice Hall, Inc., New York, pp. 274-283, 1955.

The question of land tenure is not of interest only to farmers. For instance lenders would like to exercise considerable control over the tenant's operation and occupancy, to secure effective means for collecting debt payments. Various land tenure systems can be identified but for the purposes of this research only systems common in Africa will be reviewed. As there was not much literature for this subject on Southern Africa similarities with tropical Africa will be discussed as documented by Livingstone and Ord.

Livingstone and Ord identified 3 distinctive features that characterized land tenure in tropical Africa compared to other continents:

1. There are relatively few huge landowners in Africa compared to Asia and especially Latin America. This is not to say that there is no rural stratification in Africa, but the degree is relatively low.
2. Generally there is no landlord class in Africa. A classical alliance of landlords and ruling class did exist in Ethiopia up to the 1974-75 land reform. This is different from Asia where landlords own much of the land, farmed by share croppers tenants in small farms.
3. Customary land tenure is widespread. Under this system the land is vested in the community or tribe. Individual families have rights to use land, but no legal title to the land which they can not mortgage or sell.

Due to the prominence of communal land system in Africa the rest of this section will be devoted to examining its advantages and disadvantages compared to land title.

Communal land tenure has been criticized in favour of individualization of tenure. Individualization is said to:

1. offer security of tenure. This is necessary to provide incentives for investment and improvement;
2. permit the use of land as collateral for loans;
3. be related to the consolidation of small plots into convenient-sized farm units.

The granting of land titles to individuals implies a right of sale as well as a right of use. "A market in land is considered necessary for the development of competitive, capitalist

agriculture which allows more efficient farmers, those who are capable of making the best use of land, to buy out the less efficient. The more efficient farmers can also expand by buying up unused land."[1] The ability to use land as security for a loan is important for development of capitalist agriculture.

Livingstone and Ord also report that on the other hand customary tenure avoids a number of disadvantages which may spring up from individualized tenure:

1. Legal ownership may not be necessary if the farmer's right to use the land is not challenged or threatened. Issuing land title will not add any incentives. In certain parts of Africa farmers grow tree crops even though they have no land title. The tree crops are an indication of investment with very lengthy periods. For instance a coffee tree takes up to 5 years before yielding its first crop.
2. The right for sale has dangers where employment opportunities are limited. Land offers the only means of livelihood. A communal system offers some guarantee of access to land, and a means of livelihood for all.
3. Individualization does not guarantee full use of the land. Abandoned land would no longer revert to the community for reallocation, but could be hoarded. An example is that in Latin America estates of large landowners (the latifundia) have been under-utilized at the same time as there has been serious overcrowding among small holders occupying the minifundia.
4. Land titles will not be effective as collateral for securing loans if creditors can actually take possession in times of default in repayment. It would be politically and practically difficult for a bank to do this. If this was possible then the next danger would be that lots of small farmers would lose their plots.

If farmers feel that the land tenure system does not secure land occupancy, they will be reluctanct to invest on the land. They will exert themsleves and their resources to produce what is necessary for subsistence needs. Despite government efforts to promote crop production

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[1]Livingstone, I. and Ord, H.W., **Agricultural Economics for Tropical Africa**, Heineman, London, 1981, p. 202.

farmers will not respond positively.

According to de Janvry[1] once it can be proved that the tenure system is not considered conducive to investment by farmers land reform may be neccessary. Land reform is called for to ensure that land tenure system is to the benefit of the country.

Land reform has various costs. For instance it may lead to a decrease in marketable surplus. Breaking up with the past so abruptly through land reform is economically and socially disruptive.

Evidence of benefits from land reform[2] is mixed. Egypt, Taiwan and South Korea are among the countries where land reform was followed by improved agricultural productivity and higher output. On the other hand Peru, Mexico, Bolivia and Iraq are some of the countries where land reform was not a success.

D. Labour Shortage at Peak Season

The importance of labour in the agricultural sector for agricultural production can not be overemphasized. For family farms the importance of family labour as a farm workforce has been mentioned earlier. Many theories of economic development have emphasized the need for the agricultural sector to be productive to the extent of releasing labour for the rapidly increasing urban population. If the rural-urban migration is not fully compensated by increases in productivity of those remaining in farms, this might have a negative impact not only on agricultural production but also on the speed of growth of the urban sector.

Such a hypothesis implies the absence of underemployment and no existence of surplus labour in the rural sector. But the following literature shows existence of surplus labour in rural areas. Mamalakis[3] identified four types of labour surplus based on four definitions of primary

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[1] de Janvry, A., "The Role of Land Reform in Economic Development", in: Eicher, C.K. and Staatz, J.M. (eds.) op. cit.
[2] As cited by de Janvry, Ibid.
[3] Mamalakis, M.J., "Primary Sector: Composition and Functions", in: Lundahl, M., (edit) **The Primary Sector In Economic Development**, Croom Helm, London, pp. 43-55, 1985.

sector.[1] There is that part of rural labour force that cannot find productive employment in agriculture.

There is also a segment of rural labour force that cannot be employed productively either in agricultural production or in the ancillary services that augment the value of agricultural products as they move towards final consumption.

The segment of the rural labour force that cannot be employed productively in any type of agricultural, service and industrial rural consumer goods production, makes another surplus labour.

The final group is composed of a segment of rural labour force that cannot find productive employment in any rural consumer and capital goods production.

Part of the above labour surpluses call for a creation of jobs in the urban sector to keep them productive to the economy. However some of these people could be more productive in rural areas than moving to the urban areas where they spend years before finding jobs. The Swaziland government is trying to get unemployed people in the urban sector to move back to the rural areas, under the *EKHAYA* slogan.[2] Several explanations for this rural-urban migration have been offered.

According to Low when homesteads make decisions on how to use labour on the various options they take into account total income. As a result they will try to produce enough for subsistence with as little labour as possible. "The labour thus allocated will be that with the lowest opportunity cost in other activities."[3] Labour supply beyond this has a choice between cash cropping and wage employment. In Swaziland so far wage employment has proved to be more attractive.

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[1]See Mamalakis, M.J., op. cit., for these definitions.
[2]The government calls for the people to go back to the rural areas voluntarily. However there is no guarantee that in future such people will not be forcibly removed from urban areas.
[3]As cited in de Vletter, F., The Swazi Rural Homestead, UNISWA, SSRU, Kwaluseni, 1983, p. 153.

"High wages and social benefits in large-scale industry may also adversely affect agricultural production as migration takes place in response to the observed wage differences."[1] Migrants tend to equalize the mathematical expectations of their earnings, taking account of the probability of getting a job in the urban sector.[2] If the urban wage is double wages in agriculture then migration from rural to urban sector will take place and go on until the probability of finding a job declines to one half.

Seasonal migration is more common than permanent migration in Southern Africa. In Africa South of the Sahara, Boserup [3] noted that the migration may be either seasonal migration to mines, plantations, towns or farms in other regions or it may be more permanent migration by the head of the household or one or more adult children who transfer part of their earnings to the family members who have remained in the home village.

Migrants work in urban sectors or mines during the off-farm season. They get back to the farm during the farming season or at the time when their labour is demanded. This migration pattern dampens labour shortages on the farm during peak farming season. Given that there is usually not much work to do during off-farming season in the rural sector the migration can result in increased homestead incomes.

On the other hand some capital improvements need to be done during off-farm season. During off-farm season it may be necessary to fence fields, build crop storages and houses. All of this is traditionally adult men's work in Swaziland. However SNL farms can be expected to undertake such capital improvements if they feel that the land occupancy is secure. If able bodied persons are engaged in off-farm employment at that time, as is usually the case, this may have an effect on agricultural production for that homestead. In Swaziland rural-urban migration is undertaken mainly mainly by men. As a result women are becoming involved in what was traditionally men's work, such as ploughing, preploughing activities.

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[1]Balassa, B., **Policy Reform in Developing Countries**, Pergamon Press, Oxford, 1977, p. 12.
[2]For more information see, Todaro, M., **Economic Development in the Third World**, 2nd edition, Longman, New York.
[3] Boserup, E., "The Primary Sector in African Development", in Lundahl, op. cit.

Russell[1] pointed out the close relationship of the urban and rural sectors in Swaziland. The rural sector supplies labour to the urban sector. To the rural sector wages earned in urban sector are returned. "Swazi based employees remit more than external migrants, and are an increasing proportion of employees."[2] Wages and subsistence supplement each other. Insufficient wages are supplemented with subsistence. Where there is a coincidence of low wages and below subsistence production there is poverty. Where there is adequate wages and subsistence production there is room for accumulation through savings and/or investment.

Wage remitances to the farm allow the farm family to purchase improved inputs, such as hiring a tractor, hybrid seed, hiring labour, chemical fertilizer.

E. Deficient Marketing Infrastructure

Deficient marketing infrastructure is sometimes blamed for farmers' lack of involvement in the market sector. Marketing and production are interdependent. "Producers must be convinced that a remunerative market exists for their products ... before they can be induced to produce commmercially."[3]

Various methods of studying the marketing system of a specific industry can be identified. Caves[4] identifies three important things to be observed in such a study: market structure, market conduct and market perfomance. Rhodes[5] identifies various approaches that could be used:

1. The institutional approach which concentrates on the "who" of marketing. This involves examining those who are involved in the marketing, such as farmers, middlemen, retailers, wholesalers, brokers, processors, the government, etc.
2. The functional approach which concentrates on the "what" approach. The various

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[1]Russell, M., The Rural Development Research Project: some thoughts about the direction the Project should take, 1982.
[2] Russell, M, op. cit., p. 2.
[3]Ghatak, S. and Ingersent, K., op. cit. p. 238.
[4] Caves, R., **American Industry, Structure, Conduct and Perfomance.**, 5th edition, Prentice Hall, Inc., Englewood Cliffs, 1982.
[5]Rhodes, V.J., **The Agricultural Marketing System**, 2nd edition, John Wiley and Sons, New York, 1983.

functions of the marketing system are studied.

3. The behavioral systems approach is a combination of the above two approaches.

The functional approach is often used to study the functions of a marketing system. This approach allows classification of functions as follows:

1. buying,
2. selling,
3. storage,
4. transportation,
5. processing,
6. standardization,
7. financing,
8. market intelligence, and
9. risk bearing.

For the purposes of this research the maize marketing system in Swaziland will be examined in terms of SNL farmers' degree of perception of a maize commerical market's existence. The existence of the market is determined by its accessibility to the farmers. Various functions determine the accessibility. Among them the following will be considered:

1. transportation,
2. standardization,
3. pricing, and
4. market intelligence.

Transportation is needed to move the product from the producer to the market. Transport costs, to a large extent, depend on the infrastructure network in the country. A country with a well developed transport system will have less transport costs than one with an undeveloped one. Large scale farmers often own trucks to transport their products to the market. The situation faced by small farmers is different as they rely on hired transport or on the commercial market providing it. The procurement policy of the commercial market is

essential to small farmers.

In the case of a commercial market that has access to local purchases and imports the price paid has influence on the choice of where to buy. In the case of SMC the government sets the price to be paid to local producers. Often this price is higher than SMC pays for imports. This differential pricing makes imports more attractive to SMC than local produce.

Standardization involves setting minimum quality of the product to be accepted. Standardization is essential in developed agricultural markets, as many "buyers of agricultural commodities will buy unseen if, and only, the commodity is graded".[1] Such standards must not be set so high such that most producers cannot meet them. At the same time standards must not be compromised to the detriment of health quality.

The commercial market is more prone to buy from sellers with good quality products. Obtaining maize of quality in bulk from South Africa makes imports more attractive to SMC than occasssional surpluses from small farmers in questionable qualities.[2] The policy to only provide transport for surplus of at least 30 bags works against many SNL farmers as they cannot raise this amount individually. In recent years SMC has even suspended local purchases on the grounds that its storage was full while it continued to bring South African maize.

Marketing intelligence involves gathering information and putting it in a package that both sellers and buyers can understand. Farmers need to know prices of the various crops they can grow so that they can make intelligent decisons on how to distribute family resources into production of crops. Prices of various inputs must be known to the farmers. The farmers must also be informed of markets at which prices prevail. In the case of SMC farmers must be aware of the company's operating hours as well as when the company will not be purchasing maize.

For farmers to be aware of the market information the timing and method of information dispersion is crucial. Farmers need to know prices before they start ploughing and planting. This is based on the assumption that farmers are responsive to price incentives. This

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[1]Rhodes, V.J., op. cit. p. 9.

[2]Some people question the idea that SNL farmers bring low quality maize for sale, as it is argued that they all the time to work on their small surpluses with their hands as opposed to machines used by TDL and South African Farmers.

point is developed on the next section.

The means of informing farmers must be easily available to them. In the case of Swaziland prices are announced through radios and newspapers. While radio availability to farmers may not be as questionable as newspapers, to get information through it to most farmers may require more than one day announcements. Lack of such information tends to strengthen farmers attitudes that maize is not a cash crop. The government should use as many methods as possible to disperse maize price information to farmers and at the right time.

Lack of transportation for small farmers, relatively low quality of output from small farmers, higher local prices than import prices, and lack of market information make commercial markets inaccessible and thus are considered by small farmers to be non-existent. This works against government efforts to get increased production from small farmers.

F. Price Incentive

Meier has concluded that agricultural commodity prices have been observed to be relatively lower than that of manufactured commodities in developing countries. This bias of terms of trade against the agricultural sector is often justified on the following grounds:

1. aggregate agricultural production is not very responsive to price changes;
2. the chief beneficiaries of higher prices would be the larger size farmers;
3. higher food and other agriculture-related prices such as clothing would most adversely affect low income consumers;
4. manufacturing provides a more rapid means of growth, and that achieving that growth depends upon large transfers of income (profits) and foreign exchange from agriculture to manufacturing.[1]

Sometimes due to price support in developed countries surplus food production is experienced. When this cannot be sold it is taken to developing countries in the form of food aid. This increases supply of that product and forces prices to decrease in the recipient country.

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[1]Meier, G. M., op. cit.

As this food gets sold to the urban areas, the farmers in the rural sector finds himself with no market and has to dispose his product at uneconomic prices in order to meet his cash obligations.

Though no documented evidence exists, it may be argued that another reason for low prices is the political influence of the urban population. High food prices would result in riots and even collapse of governments. Most governments are not prepared to take that risk.

The following studies on supply response done in developing countries have produced mixed results. While the results show that in developed countries that farmers respond positively to economic incentives, as economic theory would lead us to expect, the results of developing countries are mixed. Owners of large scale, commercially oriented, highly mechanized farms in developing countries behave like farmers in developed countries. The main question remains about the smaller farmer's response.

Some studies have described small farmers in developing countries as being irrational in that they do not respond in the 'normal' way to price incentives. Small farmers are said to be inefficient and conservative. A rational, efficient producer would:

1. show a positive supply response. He would supply more to the market when the price of the commodity increases, by (a) switching a given amount of factors of production to the higher priced product in substitution for less attractive crops, now relatively less profitable, and (b) by increasing his labour effort and employment of other inputs to take account of a more profitable market for his output as a whole;
2. combine his cropping and other actitivies in the most profitable way, using the most efficient method of production, and
3. respond to opportunities to innovate by introducing new crops, and also new technology which, in the long run could reduce the cost of producing a larger output.

However small farmers in developing countries are said to be;

1. showing perverse supply response;
2. having a high preference for leisure or inelastic supply effort;

3. inefficient in a number of ways, specifically (a) using sub-optimal combination of products, (b) using poor agricultural techniques, failing to use fertilizers, pesticides thus getting low productivity, (c) being conservative and thus failing to take up extension advice.

Some studies have shown that farmers respond to increased prices by decreasing the quantity sold. In a study done by Khalifa and Simpson[1] they found that the cattle supply curve of the Western Sudanese Baggara tribes was forward sloping and elastic with respect to price. In this study it was concluded that these people desired goods and services provided by the modern sector of the economy and are prepared to sell cattle and cattle products to finance their requirements. The implicit conclusion here is that the farmer wants a specific amount of goods and services. Thus an increase in price of cattle, while that of the goods and services is unchanged, enables the farmer to obtain all his needs through selling fewer cattle, and vice versa.

In a study done in Swaziland by Low and Kemp[2] on a similar problem they found that on the overall there is a tendency for farmers to sell fewer cattle when the price is high and more when the price is low.

Narain[3] found mixed results on the study of aggregate marketable surplus in India and its response to the size of holding. While a part of marketable surplus shows an expected (desired) relation to price changes, the other part is likely to show an inverse relation to price changes.

Ezekiel and Mathur[4] found that farmers in developing countries only sell that part of output necessary to earn them the cash they require. Boeke[5] found that small scale producers in

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[1]Khalifa, A.H. and Simpson, M.C., "Perverse Supply In Nomadic Societies", in: **Oxford Agrarian Studies**, vol. 1, pp. 47-56, 1972.
[2]Low, A.R.C. and Kemp, L.R., "Destocking Dynamics: The Implication of a Swaziland Example", in: **Oxford Agrarian Studies**, vol. 6, pp. 26-46, 1977.
[3] Narain, D., "Distribution of the Marketed Surplus of Agricultural Produce by Size Level of Holding in India", in: **Institute of Economic Growth**, Delhi, 1961.
[4]Mathur, P.N. and Ezekiel, H., "Marketable Surplus of Food and Price Fluctuations in a Developing Economy", in: **Kyklos**, Fase 3, pp. 396-406, 1961.
[5] Boeke, J.H., **Economics and Economic Policy of Dual Societies**, Institute of Pacific Relations, New York, 1953.

Indonesia tend to offer less of rice or coconuts when these commodities' prices were high.

On the other hand some studies have shown that farmers respond positively to price changes in developing countries. When prices are high the quantity sold increases while lower prices result in lower quantity sold.

Behrman in his study of supply response of rice producers in Thailand found that the "estimates of the price elasticity of the marketed surplus for rice are positive...".[1] Hussan,[2] working on rice in East Pakistan using a linear regression model on acreage changes, found the price elasticity of rice and jute to be positive. He also pointed out that the price elasticity of acreage for subsistence crops is lower than that of cash crops although both are positive.

A study done by Maitha[3] on Kenya large scale farms of wheat and maize showed that they are highly responsive to price changes. He also found that the supply of coffee, during the peiod 1946-64, by small farmers to be highly responsive to price incentive. Dean[4], using tobacco supply in Malawi during the 1926-60 period, estimating a relationship between quantity supplied and price, found tobacco growing quite responsive to price incentives.

A lot of work has been done by Krishna[5] in this subject too. His results have shown positive response to price changes by farmers in developing countries. Krishna emphasizes the complementarity of technology policy and price policy. He however feels that technology is more important and elasticity of output with respect to technical change is higher than that with respect to price.[6]

Higher prices may stimulate agricultural production by;

1. "causing producers to move closer to their production-possibility frontier by better use of

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[1]Behrman, J.R., "Price Elasticity of the Market Surplus of a Subsistence Crop", in: **Journal of Farm Economics**, vol. 48, part 2, 1966, p. 892.
[2] Hussan, J.M., "A Note on Farm Response to Price in East Pakistan", in: **Pakistan Development Review**, vol. 4 *(Spring)*, 1964.
[3]Maitha, J.K., A Note on Distributed Lag Models of Maize and Wheat Production Response: The Kenyan Case"
[4]Dean, E., **The Supply Response of African Farmers: Theory and Measurement in Malawi**, North-Holland Publishing Company, Armstedarm, 1966.
[5]Krishna, R., "Farm Supply Response in India-Pakistan: A Case Study of the Punjab Region", in: **Economic Journal**, vol. 73, 1963.
[6]Krishna, R., "Some Aspects of Agricultural Growth, Price Policy and Equity in Developing Countries", in: **Food Research Institute Studies**, vol. XVIII, No. 3, 1982.

resources;

2. encouraging use of more labour and other variable resource inputs to reach higher production-function and output levels, or
3. inducing investment and the discovery and adoption of new agricultural technologies that result in new, low cost production functions."[1]

If farmers perceive the price of one crop to be low relative to others they will not produce it for the market. However if it is a subsistence crop they will produce some of it for subsistence needs. Should high yielding varieties lead to increased yield then such a crop will be produced on small areas and the rest of the land released to production of more remunerative crops for market.

G. Summary of Hypotheses Arising from the Review

Tenure Security Hypothesis

Individualization of tenure enables title holders to use the land as collateral for loans, which are often necessary for engaging in commercial farming. Title holders are more prepared to invest on capital improvements of their land than those who do not own the land. Customary tenure does not offer such advantages. In case of customary tenure other types of collateral are needed to get loans as land cannot be used. Livestock are often used in Swaziland. Cooperative members do not need collateral to get loans. However it is commonly argued that such a land tenure system is perceived as denying security and thus impedes capital formation. The tenure security hypothesis to be tested is that SNL farmers perceive land tenure as insecure.

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[1]Meier, G.M., op. cit. p. 473.

Labour Shortage Hypothesis

The high returns from wage employment relative to cash cropping (especially maize) draw labour from the rural sector to the urban sector in Swaziland or to South Africa. As most of the crop production operations are labour intensive, the remaining family members cannot cope with large areas cultivated. As a result they tend to reduce the area under maize. However the labour engaged in off-farm employment remits part of the earnings to the rural sector. Such remittances are, among other things, used for purchasing farm inputs, and even for hiring labour.

The question is to find out if the rural-urban migration is related to the reduction of area under maize on SNL. The hypothesis is that there is not enough labour to work on the farm to meet peak season requirements for labour on SNL. Rural-urban migration, encouraged by high opportunity cost of labour, has created a labour shortage on farms. Thus land under maize production has to be reduced so that the few available family workers can cope.

Low Maize Price Hypothesis

The SNL farmers are faced with cropping options. Maize however is a staple crop and virtually all farmers try to produce enough for subsistence needs. In making decisions of what crops to grow for commercial purposes the returns from the various crops are considered. Thus if farmers perceive that the price of maize is low relative to cotton or other options they will only produce maize for subsistence needs and then cotton for commercial purposes.

The hypothesis is that SNL farmers perceive maize producer prices to be relatively low. They confine production to subsistence needs, to enable production of other crops which are considered more remunerative than maize.

Lack of Commercial Maize Market Hypothesis

Even in situations where farmers may perceive the price of maize to be competitive to that of other crops, there may be no perception of the existence of markets for maize. If there

are market deficiencies in the maize marketing infrastructure the farmers may perceive such a market to be not existing. Therefore they have no incentive to produce maize for market.

The hypothesis is that farmers do not perceive a commercial market to exist for maize. As a result farmers do not consider maize as a commercial crop.

IV. DATA COLLECTION AND ANALYTICAL TECHNIQUES

A. Secondary Data

The secondary data sources were from books, journal articles, and unpublished reports, such as government articles and papers presented in conferences.

Secondary data were obtained from Canada, Swaziland, Malawi and Zambia. In Canada the University of Alberta libraries provided published material. Information was obtained from the Social Sciences Research Unit (SSRU) of the University of Swaziland (UNISWA), Malkerns Research Station. To supplement and update the information, interviews and discussions were held with staff members in the SSRU, Malkerns Research Station, Swaziland Milling Company (SMC), Ministry of Agriculture and Cooperatives, Luyengo Campus of UNISWA, Central Cooperative Union (CCU), Ministry of Agriculture and Ministry of Finance in Malawi, and the Ministry of Agriculture in Zambia.

B. Primary Data

A personal interview survey method was used to collect primary data in Swaziland. A questionaire was the main instrument used to collect primary data. The research was carried out on SNL.

The population was stratified into two groups, subsistence oriented (maize) farmers and commercial oriented (maize) farmers, which are defined below. In studying the paradox it was expected that commercial oriented farmers do not decrease the area under maize while subsistence oriented farmers decrease it.

Despite much research efforts in Swaziland there is little consensus on the definition of commercial and non-commercial farmers on SNL. Testerink suggests that a commercial farmer is one whose farm income share at least exceeds 12% of total income.[1] The 12% is based on de Vletter's findings that on average the share of crop production represents 12% of the total

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[1] Testerink, J., Agricultural Commercialization in Swaziland - Farmers Compared, Research Paper No. 11, SSRU, Kwaluseni, 1985.

homestead income (cash + in kind). However there is a problem of getting homestead income and farm income share.

According to Hinderink and Sterkenburg "agricultural commercialization involves a deliberate action on the part of the agricultural producers of their own free will or by means of coercion to use the land, labour, implements and animal inputs in such a way that a greater or smaller part of the crops produced is for exchange or sale. Incidental sales due to emergencies or accidental surplus that are marketed should not be considered as a form of agricultural commercialization".[1] Problems with finding reliable information about farmers' intentions make implementation of this definition unreliable.

Sibisi's keen farmers are characterized by intensive farming of their own accord, on their share of SNL, and have had no outside help in all farming aspects. [2] Russell, Mbatha and Sithole have defined a successful farmer as one who produced at least enough maize for subsistence needs.[3]

This research considers a commercial oriented farmer as one who has been observed to consistently produce at least enough maize for subsistence and most of the time sells some. The maize farmer who does not satisfy these conditions is considered a subsistence oriented farmer. The names of commercial and subsistence oriented farmers were obtained from chiefs and extension workers after the conditions were explained to them.

Sampling Frame

SNL can be classified into Rural Development Areas(RDAs) and non-RDAs. As the government is concentrating efforts and money on the RDAP and plans to incorporate all SNL into RDAs, the research was directed to RDAs.

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[1]Hinderink, J. and Sterkenburg, J.J., Spatial Aspects of Agricultural Commercialization in Africa, University of Utrecht, 1980, p. 11.
[2]Sibisi, H., Forty Keen Farmers, Ministry of Agriculture and Cooperatives, Mbabane, 1981.
[3]Russell, M., Mbatha, N. and Sithole, V., op. cit.

RDAs are classified into maximum input and minimum input. To control for the question of technical change and late adoptors, as its importance is emphasized by Krishna, the maximum input RDAs were selected.

From discussions held with research institutions' authorities and those working in the maize industry, it was pointed out that the Northern RDA, Central RDA, Mahlangatja RDA and Southern RDA had already been oversurveyed. This left six maximum input RDAs from which the research was done. These were Lubombo-Mpholonjeni, Ngwempisi, Ebulandzeni, Mayiwane-Herefords, Mahamba-Zombodze and Mahlalini-Madulini RDAs.

An RDA may cover more than one agro-climatic zone. As explained in chapter II, the Lowveld climate is not suitable for maize production, thus the survey was restricted to the Middleveld, Highveld and Lubombo zones. Arbitrarily 60 interviews were considered a reasonable number, given time and financial constraints. The interviews were split equally among the six RDAs.

Sampling Method

Each RDA consists of more than one chief's area. To cut down on costs and time one area had to be selected per RDA where all 10 interviews were done. A map with chiefs' names and areas was placed over another map with RDAs. Eligible chiefs were those whose areas were at least two thirds under one of the six RDAs.

A list of eligible chiefs was compiled and, randomly, one chief per RDA was selected. The assumption was that each chief's area was representative enough for the variables found in the whole RDA. Thus when only one chief was eligible at Ebulandzeni the survey was done there.

Selected chiefs were to be visited and with their help compile a list of commercial oriented and subsistence oriented farmers. The 10 interviews were divided equally between the two stratas. Using a table of random numbers five farmers were to be selected from each list. The chiefs would then give directions to the selected farmer's homesteads where interviews were

to be held.

Testing Sampling Method: During discussions with the director of SSRU it was made clear that the proposed sampling method had not been tried before. It was therefore necessary to test it. The pretesting of the method was done in conjunction with the questionaire pretest. Malindza was selected for the pretest because of its closeness to Mafutseni, where the author was based, and because it could be easily reached by bus, given transport problems encountered early in the research.

At Malindza the chieftainess's permision to do the research was obtained. However three days of visits failed to attain lists of farmers. After consultations with SSRU director it was decided that extension workers be used in place of chiefs. From extension workers lists of farmers were obtained and classification into two strata was done.

During the main survey it was discovered that the extension worker at Mayiwane-Herefords RDA had only been there for three months and was not in a position to help with the stratification. Thus only in that area was the chief used to stratify the sample.

Questionaire Design

One questionaire consisting of 58 questions, divided into eight sections was designed (see Appendix A). The questionaire was designed to collect both discrete and continuous data.

Section I was about homestead membership. Information on livestock ownership was obtained on section II. Section III was about implements used for ploughing and planting. Information on the various crops grown and specifically size of land used for maize and type of seeds used was obtained in section IV. Sources and types of fertilizer used was collected on section V. Insecticides usage information was obtained through questions in section VII. The final and longest section was concerned with maize output and marketing.

Some of the questions were multiple type, but most of them were open ended. The questions were limited to operations of 1984/85 crop season, though one question on how much land was under maize during 1983/84 season was asked.

The questionaire was originally designed in English. Since most SNL farmers do not speak English it was translated to SiSwati. Any attempt to take an English questionaire to the field and translate during interviews would have proved inconsistent as wordings during such translations would vary. Dr. Lwandle Kunene, a Lecturer with the Department of African Languages at UNISWA, and Miss Sitani Moya, a SiSwati teacher at Lozitha Secondary School, made two independent translations. From these two versions and a third one prepared by the author the final SiSwati questionaire was prepared.

Questionaire Pretest: As part of pretesting the questionaire, the accuracy of the translation was tested. The questionaire was tested to see if questions were understood by farmers and none of them were sensitive to farmers.

During the pretest respondents did not understand the relationship between the problem being investigated and collecting names, ages and relationship of homestead members in section I.[1] They believe that such information is required only for population census. Many of them were not prepared to give this type of information.

In the final questionaire section I was simplified (see Appendix A). While this seemed to settle the problem, the question of who to include as members of homestead remained. This problem has been mentioned in other studies but an agreement is yet to be reached on homestead membership definition in the SNL context.[2] Respondents were asked to include those that they considered as members, but not daughters who are married and staying with sons in-law outside the home.

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[1]This had been done to increase accuracy in number of homestead members.
[2]Mbatha even mentioned the problems of knowing who is married and who is not fully married. (Mbatha, D.N., The Ambiguities of Swazi Marriage, Research Paper No. 5, 1983).

Obtaining information on size of fields under maize production showed that some farmers did not know the sizes. Few had fields measured by extension workers. So this information was given in acres and number of fields. This was left to be converted to same units latter.

Questions on how much money was spent on fertilizer proved irrelevent to those who used kraal manure, as this was obtained from the homestead's kraal. So information on prices of fertilizer refers to chemical fertilizer only.

When farmers were asked what method they prefered for announcing prices in section VIII (question 38 on Appendix A) the presence of extension workers was suspected to have influence in answers. Many farmers were opting for information to be conveyed to them by extension workers. The extension worker was subsequently asked to do the introduction and then stay away during the interview. This way his influence was reduced or eliminated.

C. Tests for Differences Between Subsistence and Commercial Oriented Farmers

The tests used for the four hypotheses depend on whether or not commercial and subsistence oriented farmers are from two different populations or one. Statistical tests were done to see if the two strata are similar. Five tests were used. The decision rule was to take the two strata as similar if at least three of the tests showed the two to be similar. Otherwise the strata would be treated as significantly different from each other.

Using analysis of variance (ANOVA) the samples were tested on the following variables: (i) acreage change in maize production between 1983/1984 and 1984/85, (ii) sales volume during the 1984/85 crop season, (iii) perceived price of a 70kg bag of maize, (iv) homestead membership, and (v) perceived land tenure security.

Acreage Change Variable

The acreage change variable was obtained by converting fields and acres information

into hectares.[1] It refers to the change in area seeded to maize between 1983/84 and 1984/85 crop seasons.

The null hypothesis states that there is no significant difference between commercial oriented and subsistence oriented farmers with respect to acreage change. The alternative hypothesis states that commercial oriented farmers are different from subsistence oriented farmers with respect to acreage change. The level of significance is arbitrarily selected at 0.05. Using *SPSSX* the ANOVA results are presented in a table summary form below:

Table IV.1 **Analysis of Variance Results with Respect to Acreage Change.**

Source	D. F.	Sum of Squares	Mean Squares	*F* ratio	*F* probability
Between Groups	1	0.0042	0.0042	0.1524	0.6977
Within Groups	58	1.5857	0.273		
Total	59	1.5898			

Since the *F* probability (0.6977) of difference by chance is greater than 0.05 the null hypothesis was accepted. This means that the two samples are not significantly different from each other with respect to acreage change.

Sales Volume Variable

Sales volume refers to the volume of maize sold by farmers during the 1984/85 crop season.

The null hypothesis states that the commercial oriented farmers are not significantly different from subsistence oriented farmers with respect to amount of maize sold. The alternative hypothesis states that the two samples are different in this respect.

The significance level is selected at 0.05. The ANOVA results are presented in the table below.

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[1]For convertion of fields to hectares the method utilized by Sithole on the Central Rural Development Area was employed.

Table IV.2 **Analysis of Variance Summary with Respect to Sales Volume.**

Source	D. F.	Sum of Squares	Mean Squares	*F* ratio	*F* probability
Between Groups	1	4218.9880	4218.9880	6.3889	0.0143
Within Groups	57	37640.6391	660.3621		
Total	58	41859.6271			

The *F* probability (0.0143) is less than 0.05 and so the null hypothesis was rejected. This means that the two samples are significantly different from each other with respect to sales.

Homestead Membership Variable

The variable homestead membership is a sum of homestead members above 10 years and below 10 years. The null hypothesis is that commercial oriented farmers are not significantly different from subsistence oriented farmers with respect to homestead membership. The alternative hypothesis states that the two samples are different. The significance level is arbitrarily selected at 0.05. ANOVA results are presented in the table below.

Table IV.3 **Analysis of Variance Summary Results with Respect to Homestead Membership**

Source	D. F.	Sum of Squares	Mean Squares	*F* ratio	*F* probability
Between Groups	1	0.8167	0.8167	0.0135	0.9080
Within groups	58	352.4333	60.5592		
Total	59	3513.2500			

The *F* probability (0.9080) is greater than 0.05. So the null hypothesis was accepted. The alternative hypothesis is rejected. This means that the two samples are similar with respect to homestead membership.

Perceived Price Variable

Perceived price refers to the price that farmers reported when asked what a 70kg bag of maize's price was after the 1984/85 season.

The null hypothesis states that the two samples are not different from each other with respect to perceived price. The alternative hypothesis states that the two are different. The significance level is selected at 0.05. Results of ANOVA are presented below.

Table IV.4 **Analysis of Variance Summary with Respect to Perceived Price.**

Source	D. F.	Sum of Squares	Mean Squares	*F* ratio	*F* probability
Between Groups	1	10.1084	10.1084	1.3241	0.2548
Within Groups	55	419.8916	7.6344		
Total	56	430.0000			

Since the *F* probability (0.2548) is greater than 0.05 the null hypothesis was accepted. This means that the two samples are not significantly different from each other with respect to perceived price.

Tenure Security Variable

Farmers were asked to rank on a scale of 1 (very sure) to 5 (uncertain) how sure they were that they could stay as long as they wanted on their land. (see question 54 on appendix A). This is the perceived land security variable used.

The null hypothesis is that there is no significant difference between commercial oriented and subsistence oriented farmers with respect to perception of land security on SNL. The alternate hypothesis states that commercial oriented farmers are significantly different from subsistence oriented farmers with respect to land tenure security. The level of significance is selected at 0.05.

Results of ANOVA are presented in a table summary form below.

Table IV.5 **Analysis of Variance Summary with Respect to Land Security.**

Source	D. F.	Sum of Squares	Mean Squares	*F* ratio	*F* probability
Between Groups	1	0.0000	0.0000	0.0000	1.0000
Within Groups	58	34.7333	0.5989		
Total	59	34.7333			

The *F* probability (1.000) is greater than 0.05. So the null hypothesis was accepted. The results show perfect similarities between the two groups with respect to land security.

Interpretation: The tests show that commercial oriented and subsitence oriented farms are similar with respect to homestead membership, price perception, acreage change and perceived security of tenure. They are different with respect to sales volume. The fact that the two samples were found to be significantly different with respect to sales volume indicates that the stratification based on sales was done appropriately. However the similarity of the samples based on the other variables shows that commercial and subsistence oriented farms are from the same population. The expectation that commercial oriented farms do not reduce area under maize while subsistence oriented farms do so was proved wrong. Since four out of five tests show similarity between the two groups, in the rest of the analysis the two will be treated as one sample.

D. Exploratory Analysis

The purpose of this analysis is to present the context for the hypotheses testing and to explore some of the statistical properties of selected variables. Most of the primary data was not used in testing the various hypotheses, but was used as supporting evidence for purposes of interpretation. Two groups of data were used in the analysis; nominal and ordinal data (see figure IV. 1).

Figure IV.1

Figure IV.1 **Variables Used in the Analysis Classified as Nominal and Ordinal.**

Nominal	Ordinal
Price of maize	Land tenure security
Sales volume	Feelings about maize prices
Area under maize	Response to price increases
Homestead membership	Capital improvements
Amount spent on hired labour	Type of fertilizer
Absentees	Type of seeds
	Type of implements
	Type of storage
	Work done by hired labour
	Source of money for inputs
	Source of price information
	Reasons for not selling to SMC

Exploratory analysis on these variables was carried out by performing frequency distributions calculating mean, standard deviation and range.

E. Hypothesis Tests

The tenure security, price perception and labour shortage hypotheses were tested using regression analysis. Functions were estimated using Ordinary Least Squares (OLS). The lack of market hypothesis was tested using the Z test of proportions. Since five types of maize market outlets were identified, the proportion of farmers who sold maize to the SMC was compared with 1/5 (20%) in the test.

The assumptions required for the application of OLS (i.e. the 2nd order test) must be satisfied if the results are to merit confidence.[1] The basic assumptions of OLS are:

1. The independent variables are fixed while the dependent variable is random. For every fixed independent variable the dependent variable has a normal distribution.
2. The dependent variable observations are independent of each other; i.e. there is no autocorrelation.

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[1] Koutsoyiannis, A., **Theory of Econometrics**, 2nd edition, MacMillan, London, 1977.

3. The variance of the dependent variable has to be the same for all independent variables; i.e. there is homoskedasticity.
4. The independent variables must not be linearly correlated, i.e. no multicollinearity.

The dependent variable in all three regressions is acreage change. It was tested for normality using the Kolmogorow-Smirnov test. The results showed that it was not normally distributed. Using the Box-Cox procedure[1] the variable was normalized by transforming it to the power 1.7221. The normalized variable was subsequently used in the estimation.

The Durbin-Watson test was used to test for autocorrelation in the three equations, although none would be expected with cross section data. The calculated Durbin-Watson values were 2.1, 2.06 and 2.1 for the land, price and labour hypotheses respectively. These values signify the absence of autocorrelation.[2]

Scatterplots were examined to check for heteroskedasticity and none showed identifiable patterns, indicating absence of heteroskedasticity.[3] Thus the homoskedasticity assumption was satisfied.

A correlation matrix was set up. It showed little correlation between independent variables, with the highest being 0.525 between perceived maize price and homestead membership. However since the two variables are not used on the same equation it can be safely said that there is no multicollinearity among the independent variables.

The coefficient of determination, standard errors and *t* statistics are examined to ensure that the estimated functions and each independent variable explain a significant amount of variance in the dependent variable. However in this correlation analysis the independent variables that influence acreage change have not been all put into one function. For the individual equations the correlation of determination is therefore expected to be low. The *t* statistics may not be significant for all the independent variables as some of them may not have

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[1]Johnston, J., **Econometric Methods**, 3rd edition, McGraw-Hill Book Company, New York, 1984.
[2]Koutsoyiannis, A., op. cit.
[3]Intriligator, M.D., **Econometric Models, Techniques, and Applications**, Prentice-Hall, Inc., Englewood Cliffs, 1978.

influence on the acreage change.

V. RESULTS OF THE DATA ANALYSIS

A. Exploratory Analysis

The area seeded to maize between 1983/84 and 1984/85 on average decreased by 0.032 hectares. Although the decrease is small it was found to be significantly different from zero at 95% probability level.

The small decrease and large number of farmers who did not change (43 farmers) area under maize between the two periods can be explained by the fact that maximum input RDAs have been in existence for a relatively long time. As maximum input RDAs are provided with more extension and input services than minimum input and non-RDAs, farmers have learnt over time how much land they need to put under maize production given their subsistence needs and labour constraints. With more time the acreage change can be expected to stabilize at zero, *ceteris paribus*.

No unique farming system could be identified with any specific region. All farms distributed their labour and management resources to off-farm employment, livestock and cropping. The common livestock were cattle, goats and to a limited extent sheep. Data on poultry was not collected.

Only three farmers were found to have access to irrigation. Even these farmers used the water only for growing garden vegetables. Thus all farmers relied on dryland farming for maize production.

Crops other than maize were pumpkins, beans, peanuts, groundnuts, cotton, sorghum, mungbeans, sweet potatoes, cowpeas and garden vegetables. For ploughing and planting farmers used tractors (owned or hired) and oxen (owned, hired or borrowed). The average area under maize production in the 1984/85 season was 1.51 hectares. This figure compares well with the 1.59 hectares reported in previous studies[1] (see Chapter II). The maximum area under maize was 9.9 hectares while the minimum was .20 hectares.

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[1]Ministry of Agriculture and Cooperatives, Review of RDAP, op. cit.

The role of cattle as a source of draught power was confirmed, with 81.7% of farmers using cattle (alone and combined with tractors) for ploughing and planting (see table V.1). 58.3% of the farmers used tractors in ploughing and planting. Tractor shortage in RDAs was often blamed for the low usage.

Use of own tractor can be associated with emergent farmers. Hired tractor usage was not restricted to a particular group as the RDAP provides tractor pools to all farmers. Its usage depends on availability of cash to pay for it. Another source of hired tractors is private owners, usually other farmers, who having small holdings, have time to hire out their tractors. This latter method is used to supplement farm income.

Hybrid maize seeds are gradually replacing local maize. Table V.2 shows that 78.3% of the farmers used hybrid seeds only, while another 20% combined it with traditional seeds. Use of traditional seeds confirm previous findings[1] that the 'good old' tasting local maize is not fully abandoned.

Table V.3 shows that only 1.7% of the farmers used nothing to fertilize maize fields while 80% of farmers used some chemical fertilizer (alone or with kraal manure). This indicates an increase from de Vletter's 55.4%.[2] The increase in use of chemical fertilizer, among other things, implies increased use of planters, as chemical fertilizer is usually applied through planters.

While increased use of chemical fertilizer by farmers is acknowledged, it should be pointed out that the amount applied may not necessarily be the optimum recommended. It has been observed in previous studies that farmers use about one quarter of the recommended quantity of fertilizer. This results in less than optimum yields realized by farmers.

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[1]Russell, M., Mbatha, N. and Sithole, V., op. cit., and Testerink, J., op. cit.
[2]de Vletter, F., Socio-Economic, op. cit.

Table V.1 **Distribution of Implements Used for Ploughing and Planting by SNL Farmers in 1984/85 Season.**

Implements	Number.	Percentage
Own oxen	21	35.0
Borrowed Oxen	1	1.7
Hired Oxen	2	3.3
Own Tractor	2	3.3
Hired Tractor	6	10.0
Hired Tractor & Own Oxen	16	26.7
Hired Tractor & Borrowed Oxen	7	11.7
Own Tractor & Own Oxen	2	3.3
Hired Tractor & Hoes	2	3.3
Donkeys	1	1.7
TOTAL	60	100.00

SOURCE: Survey Results.

Table V.2 **Distribution of SNL Farmers According to Types of Maize Seeds Used in 1984/85 Season.**

Type	Number	Percentage
Hybrid	47	78.3
Traditional	1	1.7
Both	6	20.0
Total	60	100.0

SOURCE: Survey Results.

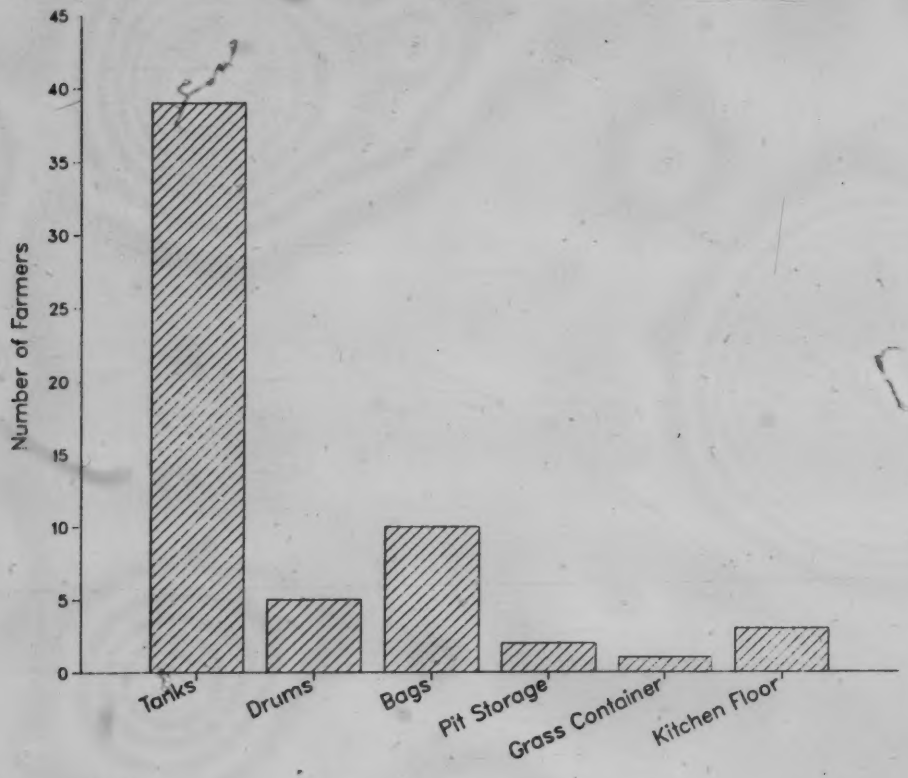
Table V.3 **Distribution of SNL Farmers by Type of Fertilizer Used During the 1984/85 Season.**

Type	Number	Percentage
Kraal Manure only	11	18.3
Chemical Fertilizer Only	21	35.0
Kr. & Chem. Mixed	13	21.7
Kr. & Chem. Seperate	14	20.0
Nothing	1	1.7
TOTAL	60	100.0

Kr. & Chem. = Kraal Manure and Chemical Fertilizer.

SOURCE: Survey Results.

Figure V.1 **Distribution of Sampled SNL Farmers According to Type of Maize Storage Used in 1984/85.**



SOURCE: Survey Results.

On-farm storage facilities used by farmers are presented on figure V.1. The increased use of metal tanks for maize storage was also confirmed . Thirty nine of the sixty farmers used metal tanks to store their maize.

The average sales volume was 9.8 bags per homestead, with a standard deviation of 26.87. As a lot of farmers did not sell maize the range at 200 bags and the standard devition are high.

B. Test of Hypothesis Number One: Security of Tenure

Results: The estimated regression produced the following equation:

$$Change = .455 + .062\ security$$
$$(.030)^{*}$$

$R^2 = .046\ r = .214\ d = 2.1$

Figures in parenthesis are standard errors.

* means significant at 95% confidence level.

The following z formula was used.

$$z = \frac{r}{\frac{1}{\sqrt{n-1}}}$$

The computed value of z is 1.64 for testing the significance of the R^2. Since this is less than 1.96 the null hypothesis was accepted. This means that there is no significant correlation between acreage change and land security. The result was tested at the 95% confidence level.

The results reflect the fact that 86.7% of the farmers considered the land tenure on SNL to be secure. That farmers can obtain land for cultivation and exercise their own decisions on what crops to grow makes the tenure system acceptable. The problem with it is that in the long run, area allocated to homesteads will decrease as the number of homestead increase. This decrease is already evident as 10 years ago the average farm size on SNL was 3.00 hectares compared to today's 2.75 hectares.

Table V.4 **Type of Capital Improvements Undertaken by Sampled SNL Farmers Between 1981/82 and 1984/85 Seasons (%)**

Capital Improvement	Percentage
Fencing	51.7
Drainage Improvement	5.0
Irrigation Channels	6.7
Tractor Purchase	5.0
Storage Building/Purchase	26.7
New Buildings	70.0

SOURCE: Survey Results.

The prominent and probably the most expensive capital investment was new houses. Most of the houses are built out of cement blocks and roofed with corrugated iron. 70% of the farmers engaged in buiding new houses. The tradition is such that when a household is evicted from the land by the chief it has to move to another area and is not compensated for any buildings left. The farmers' preparedness to undertake such capital investments is an indication of their confidence on the security of tenure.

Interpretation: The decrease in area under maize has little to do with security of tenure, as farmers do not completely neglect the released land. Instead the land is used for producing other crops. The decrease in maize area indicated farmer's preference of crops other than maize for commercial purposes. For instance the area under cotton production on SNL increased from 2,999 hectares in 1970-71 to an estimated 23,500 hectares in 1980-81.[1]

Farmers' preparedness to embark on capital improvements supports the result. All farmers took part in at least one of the six identified capital improvements. (see table V.4).

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[1]Ministry of Agriculture and Cooperatives, Review of the Rural Development Areas Programme, op. cit. Also, see Kliest, T.J., The Smallholder Cotton Sector in Swaziland: Some Thoughts for Future Research, Research Paper No. 2, SSRU, UNISWA, 1982.

C. Test of Hypothesis Number Two: Labour Availability

Results: The estimated regression produced the following result, with the details on the independent variables presented in table V.5.

Change = .673 -.002membership -.0009labour -.015absentees

(.0049) (.0004) (.0204)*

R^2 =.38 r=.601

Figures in parenthesis are standard errors.

* means significant at 95% confidence level.

Table V.5 **A Summary of Statistics on the Independent Variables Used on the Regression.**

Variable	Mean	S.D.	S.E. Mean	Variance	Range
Membership	13.75	7.717	.996	59.547	42.00
Labour	9.217	4.438	.573	19.698	19.00
Absentees	1.38	2.32	.299	5.359	13.00

S.D. means Standard Deviation. S.E. means Standard Error.

This results in a computed value of *z* of 4.42. Since this is greater than 1.96 the null hypothesis was rejected. This means that there is a significant correlation between the acreage change and the labour availability. 31.7% farms had to hire labour to help with maize production and post production activities. 73% of these farms hired labour for weeding.(see table V.6) This confirms the fact that weeding requires more labour than the other maize related activities.

Table V.6 **Distribution of SNL Farmers by Type of Work Done by Hired Labour During the 1984/85 Season.**

Work	Number	Percentage
Ploughing & Planting	3	15.8
Weeding	14	73.7
Harvesting	2	10.5
Sub-Total	19	100.0
Not Applicable	41	-
Total	60	-

SOURCE: Survey Results.

Interpretation: The fact that 68.3% of the farmers did not hire labour confirms the important role of family labour to crop production on SNL. This does not undermine the role of off-farm wages on input purchases (see table V.7). Instead it implies that once farm labour is reduced the remaining members of the family cultivate land that they believe can be handled. Should, in time of peak labour demand, work overpower them, part of the remitted wages is used to hire labour to help with the work. Once work is under control hired labour is released and family labour continues. The study showed that farmers spent on average E70.34 on hired labour with a range of E0.00 to E345.60.

The rural sector's lack of attractiveness (push effect) and/or the urban sector's attractiveness (pull effect) has led to rural-urban migration of the magnitude that conflicts with the government's agricultural objectives. Given that the country faces high unemployment

Table V.7 **Source of Money Used by SNL Farmers to Pay Hired Labour During the 1984/85 Season.**

Source	Number	Percentage
Crop Sales	12	63.2
Livestock Sales	2	10.5
Off-farm Income	5	26.3
Sub-Total	19	100.0
Not Applicable	41	-
Total	60	-

SOURCE: Survey Resuslts.

rates, with expanding shanty towns around the towns, there is room for reversing the trend by getting the unemployed back to the rural areas, The effect of the *EKHAYA* policy still need time to be evaluated. This policy can be enhanced by making the rural sector attractive.

As mentioned earlier, young to middle aged men migrate to the urban sector. The movement of men to off-farm work results in jobs such as preploughing activities neglected. The remaining women have always had other responsibilities while men did such work. The absence of men has not helped reduce such responsibilities. Thus there is less time for preploughing activities. The less land prepared for ploughing the less land will be cultivated.

Working on cash cropping is less paying than off-farm employment. Commercial farming is less profitable than anticipated, and farmers tend to move from farming into a range of entrepreneurial activities, like tractor and transport services to supplement farm incomes.[1] According to Funnell, in 1976 one member of a rural household working at the mines could bring in an income very nearly similar to that provided by improved farming involving all the household members.[2]

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[1]Sibisi, H., op. cit.
[2]Funnell, D., Change in Farm Income, op. cit.

It may be that off-farm employment results in increased homestead incomes. This is supported by Low's argument that homestead incomes are considered when labour is distributed among the various activities on SNL. If a farm homestead, through releasing some of its labour force to work off-farm, ends up with high income then subsistence needs will be supplemented with maize purchases. The maize pricing policy and availability of maize imports at subsidized South African prices encourages decisions to purchase imported maize and maize meal. Any surplus income is usually invested on livestock purchases, which exacerbates the overgrazing problem.

D. Test of Hypothesis Number Three: Relatively Low Maize Prices

Results: The estimated regression produced the following equation:

$$Change = 1.21 - .026price + .055feeling - .136response$$
$$(.0118)^{\bullet} \quad (.0947) \quad (.0789)^{\bullet}$$

$R^2 = .36$ $r = .576$

Figures in parenthesis are standard errors.

• means significant at 90% confidence level.

The average price was E26.00 with a standard deviation of 2.77. The standard error around the mean was .367 while the variance was 7.679. The price range was E10.00. *Response* refers to farmers's intended response to a maize price increase. Farmers had to state whether or not they would increase maize production. On the other hand *feeling* refers to farmers feelings about the level of maize price. Farmers were asked to state whether they felt the price was high enough or not. Since the response and feeling variables were used in dummy variable forms these statistics could not be calculated.

The *z* value was computed to be 4.62. Since 4.62 is greater than 1.96 the null hypothesis is rejected. This means that there is a significant relationship between price and the acreage change. This result confirms the hypothesis that farmers feel that maize prices are relatively low. Despite the fact that research calculations showed that the average perceived price was

E26.00, over the minimum gazetted producer price by E4.40, farmers still consider it low. The high prices in the informal markets also indicate that the scarcity value of maize is higher than the government price suggests.

Interpretation: Given that the climate in the country supports production of various crops, rational SNL farmers use the land released from maize production to produce more remunerative crops. Factors of production are switched to higher priced crops in substitution of the less attractive maize. This point is also confirmed by the fact that most of the so called commercial farmers in the country are characterized by producing either cotton or tobacco for commercial purposes.[1]

The government's pricing policy suggests that the government considers farmers to be irrational and not responsive to price incentives. The announcing of maize prices in May, after harvest, is too late to influence production. 73.3% of the farmers reported their dissatisfaction about the timing of price announcements. In Malawi, a country which often exports maize, the prices are announced between August and September while the peak ploughing month is November. Such a pricing system enables farmers to consider different prices when production decisions are made.

The decision to use import parity when setting maize prices could be acceptable if the costs of producing maize in Swaziland are similar to South Africa's. But this is not the case, as South African farms are large and highly mechanized compared to SNL farms. The difference in farm structures results in different costs of production. Swaziland also gets most of the farm inputs (such as chemical fertilizer, maize seeds, pesticides, herbicides) from South Africa. South Africa transfers input storage costs to Swaziland, as evidenced by a CCU storage at Northen RDA (Ntfonjeni headquarters) that was full of chemical fertilizer in May 1985, when farmers were not expected to start purchasing until September. Combined with transport costs, such inputs are sold to farmers at an absolutely higher price than paid by South Africa's farmers. This tends to increase the cost of inputs to SNL farmers thus making maize prices

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[1]Mahlangatja RDA is an exception to this as most farmers produce maize for market.

based on import parity less attractive to SNL farmers.

Evidence from these data shows that SNL farmers respond to price incentives. On table V. 8 it can be seen that 63.3% (i.e. those who would produce more and those who would use more inputs) of the farmers are prepared to increase maize production if the price of maize was increased.

Table V.8 **Distribution of SNL Farmers According to their Intended Response to an Increase in Maize Price, 1985.**

Response	Number	Percentage
Produce More	36	60.0
Find A Job	2	3.3
No Change	18	30.0
Sell to SMC	1	1.7
Use More Inputs	2	3.3
Do Not Know	1	1.7
Total	60	100.0

SOURCE: Survey Results.

While we would not suggest that the government control all crop prices as is done in Malawi and Zambia, the Swaziland government should consider prices of all crops that compete with maize for the limited SNL resources (such as labour, land and finance) when setting maize

prices, if the degree of self-sufficiency in maize is to be increased.

Table V.9 **Distribution of SNL Farmers by Chemical Fertilizer Outlets Used During the 1984/85 Season**

Outlet	Number	Percentage
Co-op	28	58.3
Store	4	8.3
Town	12	25.0
SMC	2	4.2
Farmers' Assoc.	1	2.1
Extension Worker	1	2.1
Sub-Total	48	100.0
Not Applicable	12	-
Total	60	-

Survey Results.

E. Test of Hypothesis Number Four: Lack of a Commercial Market

Results: Farmers Cooperatives have been more actively involved in the distribution of farm inputs than in the assembly of output. For instance table V.9 shows that 58.3% of the SNL farmers purchased chemical fertilizer from farmers' cooperatives.

The following formula was used for the test.

$$Z = \frac{p - P}{\sqrt{\frac{P(1-P)}{n}}}$$

The proportion of farmers who sold maize to SMC (p) is 16.1% (see figure V.2).[1]

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[1]There is an on-going Taiwan financed Maize Project in Swaziland. Under it farmers are given loans in form of input which they apply on measured fields. To repay the loan the receipients usually give the creditors (depending on size of loan) 20 bags of maize after harvest. Farmers refer to this as a Chinese project.

Substituting this value into the Z transformation formula, the computed value of z becomes 0.54. At a confidence level of 0.05 using a one tailed test the critical value is 1.645. Since 0.54 is less than 1.645 the null hypothesis is accepted. This means that SNL farmers do not consider SMC to be an existing commercial market.

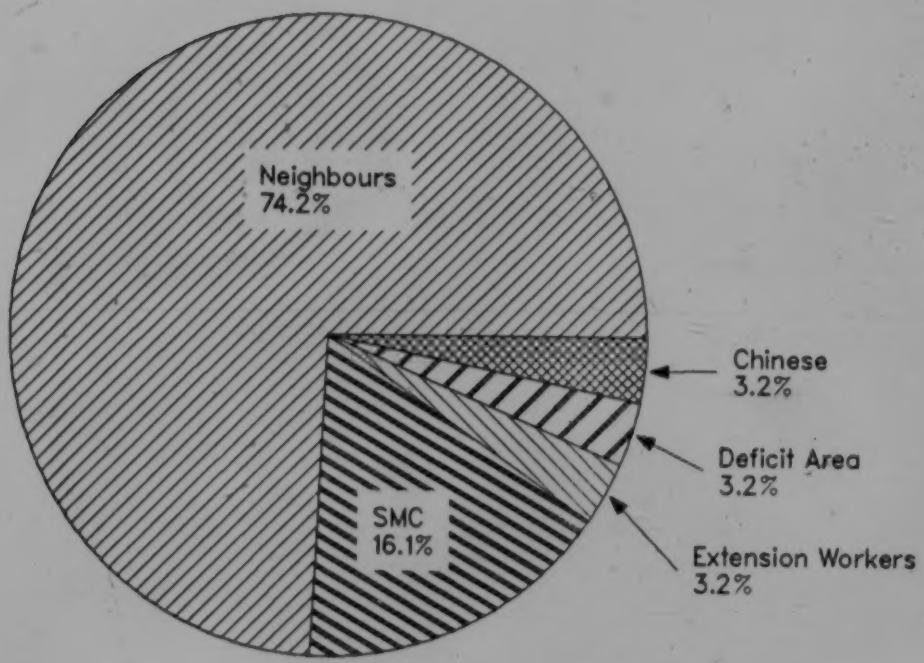
SMC is not accessible to farmers due to small surplus which make it uneconomical for farmers to take it to SMC given transport costs, and lack of transport. 84.6% of farmers who did not sell to SMC blamed it on lack of transport (see table V.10).

Interpretation: The role played by deficit neighbours as a market also influences sales to SMC. 74.2% of farmers sold to neighbours (Figure V.2). Farmers are bound by social norms to cater to deficit neighbours before selling to SMC. A farmer who has surplus is known to the community. Those who do not have enough for subsistence needs look upon him/her to purchase maize. To the buyers such a seller is convinient as they may not have to pay all the money at once or incur as much transport costs as they would if they bought from somewhere else. On the other hand, if the seller takes the maize to SMC while some neighbours struggle to make a living, the community may not appreciate him. Often the neighbours are relatives and friends. Thus surplus producers feel morally obliged to give priority to deficit neighbours.

The economic advantages to sellers associated with neighbours' market outlet, compared to selling to SMC, are as follows:

1. The buyers incur the transport costs.
2. Buyers bring their own containers.
3. The price attained from such market is higher than the government's floor price. This is confirmed by the fact that the average perceived price by the farmers was E4.40 higher than the government price.

Figure V.2 **Distribution of Sampled SNL Farmers According to Maize Market Outlets Used in 1984/85 Season (Percentages).**



SOURCE: Survey Results.

Table V.10 **Distribution of SNL Farmers by Reasons for not Selling Maize to SMC During the 1984/85 Season.**

Reason	Number	Percentage
Too Far	22	84.6
SMC Closed	1	3.8
Little Surplus	1	3.8
No Response	2	7.8
Sub-Total	26	100.0
Not Applicable	34	-
Total	60	-

SOURCE: Survey Results.

The country's lack of clear maize imports policies, which in recent years contributed to maize purchase suspension by SMC, reinforces farmers' perception of the non-existent commercial market for maize. The fact that South African maize is cheaper and can be obtained in bulk and in good quality makes imports more attractive to SMC. This results in less interest in improving procurement policies and tightening import policies, thus leaving SNL out of the formal market. Swazi farmers are aware of continuous maize imports from South Africa while their maize deteriorates in their homestead due to purchase suspensions.[1]

At the same time the influence that a large developed South Africa has on the small developing Swaziland cannot be neglected. Through the Sourthern African Customs Union (SACU) South Africa indirectly forces Swaziland to open its market to South African maize. When urged to suspend maize imports from South Africa the Minister of Agriculture was quoted saying that would be 'against the spirit' of agreement as there is free flow of goods between the two countries.[2] Other means of pressure are also applied, as evidenced by the threat by a South African Company to stop sponsoring a soccer tournament in Swaziland if its maize

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[1] Rand Daily Mail, "Anger Over Maize", September 22, 1984.
[2] Swazi Observer, "SMC Urged to Give Priority to Locally Produced Maize", October 6th, 1984.

products were not allowed to sell in Swaziland.[1]

There is an urgent need for the government to restrict issuing of maize import licences. As the policy stands it seems that even an individual can successfully apply for a licence from the Ministry of Agriculture. Restrictions to a few organizations, if not only to SMC, may ensure that SMC has market outlets for maize purchased from local farmers as well as from imports.

Table V.11 **Sources of Maize Price Information used by SNL Farmers During the 1984/85 Season.**

Source	Number	Percentage
Radio	18	30
Newspapers	2	3.3
From Shop	10	1.7
Those Who Sold	7	11.7
Never Know it	31	51.7
Other People	1	1.7
Total	60	100.0

SOURCE: Survey Results.

The method used to inform farmers about maize prices has flaws. Table V.11 shows that 51.7% of the farmers never get to know official maize prices. Radio is a good method to reach most farmers, if the announcements are made more than just on the day of the price setting. A single or one day announcement does not reach most of the farmers. Use of newspapers has the limitation as the number of farmers who have access or can read newspapers is limited. We do not advocate the abandonment of such methods. However additional methods such as uses of extension workers which was suggested by most farmers (see

[1]Swazi Observer, "Last Minute Effort to Stop Impala Running Away", September 25, 1985.

table V.12) would help. While it is true that the farmer to extension worker ratio is high for extension workers to visit all farmers, the extension worker's location on SNL makes him easily accessible to farmers who need the price information throughout the year.

Table V.12 **Distribution of SNL Farmers According to Price Announcement Method Preferred - 1985,**

Method	Number	Percentage
Ext. Workers	23	57.5
Radio	12	30.0
School Kids	4	10.0
Receipts	1	2.5
Sub-Total	40	100
Not Applicable	20	-
Total	60	-

SOURCE: Survey Results.

It might be added that educating farmers about minimum required standards to prevent them getting cheated when making sales might help.

VI. CONCLUSIONS AND POLICY IMPLICATIONS

A. Summary

The problem studied in this research was the decrease in area seeded to maize that accompanies adoption of improved farming techniques. Increases in yields that have resulted from adopting high yielding varieties have been offset by the decrease in area under maize production. With the increase in population, this decrease has led to increases in annual maize imports to supplement local production. The Swaziland government and donor agencies have spent money on projects aimed at encouraging a transition from subsistence production to commercial farming by SNL farmers. The major documented objective is to attain self sufficiency in maize production.

The farming system on SNL is such that resources are distributed to crop production, livestock production and off-farm employment activities. These activities are closely related. The main crop produced on SNL is maize and covers more than three quarters of the cultivated land. Cattle are the main livestock. Cattle are kept for sociocultural, economical and utilitarian purposes. Off-farm employment involves movement of young to middle aged men to the urban sector. Due to size of the country and improved road networks wage employees make frequent visits to the farm, with some commuting between work and home daily.

No farming system can be identified with a specific region on SNL. Any difference lies with the intensities with which crops are grown. The maize farming and post production systems in Swaziland have not performed adequately to enable the country to be self-sufficient in maize. Various explanations for this problem have been given. This research was restricted to testing four such hypotheses. The first hypothesis was that SNL farmers feel that land tenure is not secure, thus they are only prepared to invest in as little capital as possible to meet subsistence needs. With increases in yields the area under production is decreased.

The second hypothesis stated that there is a shortage of labour during peak season demand. Remaining farm labour only cultivate land that they can work on. With increases in

rural-urban migration less family members remain on the farm and thus land under production is decreased.

The third hypothesis stated that the price of maize is considered by SNL farmers to be low compared to other crops that compete for the same family resources.Maize is therefore grown for subsistence needs and the released land due to increases in yields is put under production of more remunerative crops.

The final hypothesis argued that farmers perceive no commercial market for maize to be in existence in Swaziland. This tends to reinforce the attitude held by farmers that maize is not a cash crop.

The results of the security hypothesis test showed that the land tenure system on SNL has no influence on farmers' decision of how much land to put under maize production. Farmers feel that land occupancy is secure.

The labour shortage at peak season hypothesis holds. Evidence shows that off-farm wages contribute to purchase of farm inputs. However off-farm wages are so high they discourage maize production as subsistence needs can be supplemented with purchases. The maize pricing policies make wage employment attractive as maize can be purchased at low prices, with the surplus income spent on other investments such as livestock purchases. This capability to reduce dependence on home grown maize combined with the perception of low maize prices (hypothesis three) encourages acreage reductions.

Farmers feel that the price of maize is relatively low compared to other crops. As a result they tend to consider maize as a subsistence crop. Those who want to produce for commercial purposes take up other crops that are more remunerative.

The results of the fourth hypothesis test confirmed that SNL farmers do not perceive a commercial maize market to be existing in the country. The SMC is not accessible due to transport problems and buying practices. Informal markets are preferred to SMC and absorb the largest proportion of sold maize. South African maize is more attractive to SMC than locally produced maize, due to guaranteed quality and quantity, and low prices.

B. Policy Implications

The following implications arise from the research findings.

1. The maize production and post production systems on SNL indicate that farmers have adopted improved production techniques while post harvest activities require more attention. There is a need for a major education and technological effort within the post production system. This will help reduce post harvest losses and improve the quality maize from SNL.
2. The land tenure system on SNL has no significant influence over farmers' decision on how much land to put under maize production. Capital formation on SNL does not seem to be impeded by the tenure system. Therefore there is no basis for tenure related policy review on SNL.
3. Rural-urban migration encouraged by high opportunity cost of labour has created a labour shortage on farms. The demand pattern for labour on SNL suggest that a labour policy which would enable off-farm workers to work on farms seasonally when their labour is required could be helpful. The research results also underscore a need, already recognized in the *EKHAYA* policy, to encourage movement of unemployed people from urban areas to rural areas.
4. Farmers feel that maize prices set by the government are relatively low and most of those with surplus sell to neighbours at a higher price than the government set price offered by SMC. Any policy to increase the official price beyond the import parity price may encourage formal markets to purchase even less maize from local farmers. Currently the reluctance to purchase maize from Swazi farmers appears to be caused by the quality differences between local and imported maize.

   The government of Swaziland could consider a deficiency payment policy, under which SMC buys maize at a price equal to or less than that paid for imported maize. Then the government would pay farmers a certain additional amount per bag of maize.
5. An effective commercial market for SNL maize is not available in Swaziland. High

effective prices on its own may not lead to increased production if there is no market. SMC's statutory obligation to purchase all locally produced maize brought for sale at the government set price should be enforced. This may require a revision of the current maize import licence policy.

The above five implications should not be looked upon in isolation. A comprehensive approach is required if the area under maize production on SNL is to increased. Improvement on post production systems, especially on-farm storage and handling, price policy, and provision of commercial market for SNL maize should be undertaken.

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Appendix A.

MAIZE MARKETING AND PRICE POLICIES IN SWAZILAND.

Questionaire No. _____

Name of Area: _____

Name of Chief: _____

Date of Interview: _____

I. HOMESTEAD MEMBERSHIP.

Homestead Surname: _____

Name of Interviewee: _____

Number of people who are 10 years and above: _____

Number of people who are below 10 years: _____

Number of people who are 10 years and above who are never home in summer: _____

II. LIVESTOCK.

(In numbers)

Particular.	Owned and Here.	Lent to Someone.	Borrowed.
Cattle	_____	_____	_____
Goats	_____	_____	_____
Sheep	_____	_____	_____

III. IMPLEMENTS.

1. What did you use for ploughing and planting last summer?

1. Own Oxen. _____
2. Borrowed Oxen. _____
3. Hired Oxen. _____
4. Own Tractor. _____
5. Hired Tractor. _____
6. Hired Tractor and Own Oxen. _____
7. Hired Tractor and Hired Oxen. _____

8. Hired Tractor and Borrowed Oxen. _____

9. Own Tractor and Own Oxen. _____

10. Own Tractor and Hired Oxen. _____

11. Own Tractor and Borrowed Oxen. _____

12. Other (Specify) _____

INPUTS.

IV. CROPS.

5. What crops did you grow last summer?

1. Maize. _____

2. Pumpkins. _____

3. Cotton. _____

4. Beans. _____

5. Peanuts. _____

6. Groundnuts. _____

7. Sorghum. _____

8. Vegetables. _____

9. Tobacco. _____

10. Soya Beans. _____

11. Other (Specify) _____

3. How many field do you have?

_____

4. How many of them were under maize crop last summer?

_____

5. How many of them had maize crop in the previous summer (1983/84)?

_____

6. What type of maize seeds did you use?

1. Hybrid. _____

2. Traditional. _____

3. Both. _____

7. Where did you buy maize seeds?

1. Local Co-op Shed. _____

2. Grocery Store. _____

3. Nearest Town. _____

4. Other (Specify). _____

8. (If purchased) How much did it cost?

_____

V. FERTILIZER.

9. What did you use to fertilize maize fields?

1. Kraal Manure only. _____

2. Chemical Fertilizer only. _____

3. Kraal Manure and Chemical Fertilizer - Mixed. _____

4. Kraal Manure and Chemical Fertilizer - Separately. _____

5. Other (Specify) _____

6. Nothing. _____

(If the answer to question 9 is 6 move to question 14) 10. How much did you use?

_____

_____

_____

11. Where did you buy your fertilizer?

1. Local Co-op shed. _____

2. Grocery Store. _____

3. Nearest Town. _____

4. Other (Specify) _____

12. (If purchased)How much did it cost you?

13. Where did you get money to purchase fertilizer?

INSECTICIDES.

14. Did you use any insecticides?

1. Yes.
2. No.

(If the answer to question 14 is 1 ask the following, otherwise move on to question 20) 15. What type of insecticides did you use?

16. How much did you use?

17. Where did you buy insecticides?

1. Local Co-op Shed.
2. Grocery Store.
3. Nearest Town.
4. Other (Specify)

18. How much did it cost?

19. Where did you get money to purchase inseticides?

LABOUR.

20. Did you hire any labour to work on your maize fields last summmer?

1. Yes.

2. No. _____

(If the answer to 20 is 2 move to question 24)

21. What work did they do?

1. Ploughing. _____

2. Planting. _____

3. Weeding. _____

4. Harvesting. _____

22. How much did you pay them?

_____

_____

_____

23. Where did you get money to pay them?

_____

_____

OUTPUT & MARKETING.

24. How much maize did you harvest last season?

_____

_____

_____

_____

25. Where do you store your maize?

_____

_____

_____

_____

26. What do you use to prevent weevil and/or mice from damaging your maize while stored?

_____

27. Did you sell any maize/or do you expect to sell any from last summer's harvest?

1. Yes.
2. No.

(If the answer to question 27 is 2 move to question 36) 28. How much did you/do you expect to sell?

29. To who did you/do you expect to sell your maize?

1. Deficit Neighbours.
2. Swaziland Milling Company.
3. C C U.
4. Other (Specifiy)

30. Other than that is there any other market for your maize?

31. How were you/do you expect to get paid?

1. Cash.
2. Cheque.
3. Other (Specify)

(If the answer to question 29 is 2 ask question 31 otherwise move to 33)

32. Are you satisfied with the way they measure and grade your maize?

Least Satisfied 1 2 3 4 5 Very Satisfied.

33. How was/will maize transported to the buyer?

34. Is such transport always available when you need it?

35. (If not sold to SMC) What are the reasons?

36. How and when do you get to know maize prices offered by the Swaziland Milling Company or CCU?

37. Are you satisfied with this method and the time at which you get to know the maize prices?

1. Yes.
2. No.

(If the answer to question 36 is 1 move to question 38)

38. What method would be convinient to you for announcing maize prices and what time would you like it be be announced?

39. What is the current price of a bag of maize?

40. Are you happy with the level of maize prices paid to farmers?

41. What would you do if maize prices were increased?

(If no maize was sold ask the following, otherwise move on to question 51)

42. Why did you not sell maize?

43. Have you ever sold maize before?

1. Yes.

2. No.

(If the answer to question 42 is 2 ask the following otherwise move on to question 46) 44. To who did you sell?

45. How long ago was that?

46. Why did you stop selling maize?

47. Which crop do you think would provide more returns to a farmer?

48. Why do you think that crop has more returns?

49. Why do you think farmers are reluctant to produce maize for the market?

50. What is the distance to the nearest maize market from here?

51. Do you and your family have any economic goals that you are trying to attain?

52. How far are you from achieving them?

Very Far 1 2 3 4 5 Very Close

53. What have you and your family been planning to buy but have been postponing till you get money?

_____

54. How sure are you that you can stay as long as you want on this land?

Very Sure 1 2 3 4 5 Very Uncertain.

55. Have you ever borrowed money from someone in the last 3 years?

1. Yes. _____

2. No. _____

(If the answer to question 54 is 2 move to question 56)

56. What was the money used on?

_____

_____

57. Have you done any of the following in the last 3 years?

Fencing?

1. Yes. _____

2. No. _____

Drainage improvement?

1. Yes. _____

2. No. _____

Irrigation Channels?

1. Yes. _____

2. No. _____

Bought any tractor?

1. Yes. _____

2. No. _____

Build any storage?

1. Yes. _____

58. Evidence of new buildings?

1. Yes. _____

2. No. _____

THANK YOU VERY MUCH.

Appendix B.

Agriculture's Contribution to Gross Domestic Product (Market Prices) - in Swaziland, (1967/8 - 1982)

Year	Title Deed Land		Swazi Nation Land	
	Value (E'M)	% Total	Value (E'M)	% Total
1967/8	7.8	15.4	6.9	13.6
1971/2	20.0	22.1	12.7	14.0
1972/3	37.6	33.4	4.1	3.6
19773/4	42.0	27.5	5.4	3.5
1975/6	31.9	12.6	15.2	6.0
1977	64.4	16.4	10.4	2.6
1978	71.6	16.1	15.3	3.4
1979	72.2	16.3	11.0	2.5
1980	78.5	16.9	15.0	3.2
1981	89.0	17.9	15.5	3.1
1982	91.4	18.6	8.6	1.7

SOURCE: Swaziland Government, Annual Statistical Bulletin.

Appendix C.

Value of Swaziland's Agricultural Exports (including Forestry). (1960-1982)

Year	Value (E'Million)	% of Total
1960	6.9	5.74
1965	19.4	63.2
1969	30.1	67.5
1972	47.0	76.1
1974	100.4	83.9
1976	117.6	74.9
1978	129.9	76.1
1980	214.1	76.7
1982	226.3	68.1

SOURCE: Swaziland Government, Annual Statistical Bulletin.

Appendix D

Maize Production by Type of Tenure and National Imports (tonnes) (1969/70 - 1982/83).

Crop Year	National	TDL	SNL	Imports
1969/70	62601	4518	58083	23399
1970/71	80188	7894	72294	16932
1971/72	120291	10499	109792	14771
1972/73	87834	9941	77893	25128
1973/74	117254	8676	108578	20410
1974/75	93911	5930	87961	20668
1975/76	97463	11358	86103	27641
1976/77	73337	9086	68764	35060
1977/78	109464	8904	96329	50574
1978/79	109231	8726	97536	48875
1979/80	105554	8819	96735	32875
1980/81	97860	3416	93691	44969
1981/82	60267	4724	52267	49674
1982/83	57834	2834	55000e	-----

e = estimate.

----- = data not available.

SOURCE: Review of the RDAP.

Appendix E

Swaziland's Customs Union Receipts as a Proportion of Total Government Revenue (E' million) (1976/77 - 1984/85).

Year	Value (E'm)	% of Total Revenue
1976/77	13.153	21
1977/78	38.943	48
1978/79	54.153	55
1979/80	74.237	59
1980/81	86.853	58
1981/82	62.666	47
1982/83	117.600	65
1983/84 (Provisional)	120.700	66
1984/85 (Budget)	130.400	61

SOURCE: 1976/77-1981/82: Swaziland Government, **Annual Statistical Bulletin**, (Mbabane, Central Statistical Office, 1982).

1982/83-1983/84: **Annual Report of the Central Bank of Swaziland**, (Mbabane, Central Bank, 1983-84).

Appendix F

Notice of Maize Purchase Suspension by the Swaziland Milling Company.

The Swazi Observer, Tuesday, June 11, 1985.

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SWAZIMILLS

SWAZILAND MILLING

A DIVISION OF SWAKI INVESTMENT CORPORATION LTD

IMPORTANT ANNOUNCEMENT

The Board of Swaki (Pty) wishes to inform the public that, because of circumstances beyond its control, it has been forced to close its maize mill at Matsapha.

The present suspension of maize purchases will therefore become permanent, and farmers are advised to make other arrangements for the sale of their maize.

However, Swaziland Milling intends to maintain the supply of maize meal and maize products to its customers after the mill is closed towards the end of this month.

2711/11,12June

Appendix G

Distribution of SNL Farmers According to the Preferred Time for Maize Price Announcements - 1985.

Time	Number	Percentage
Before Planting	6	13.6
After A.P.B.H.	18	40.9
Before Shelling	1	2.3
After Harvesting	9	20.4
During Harvest	5	11.4
During Planting	4	9.1
No Response	1	32.3
TOTAL	44	100.0

A.P.B.H. = After Planting but Before Harvest.

SOURCE: Survey Results.

Appendix H

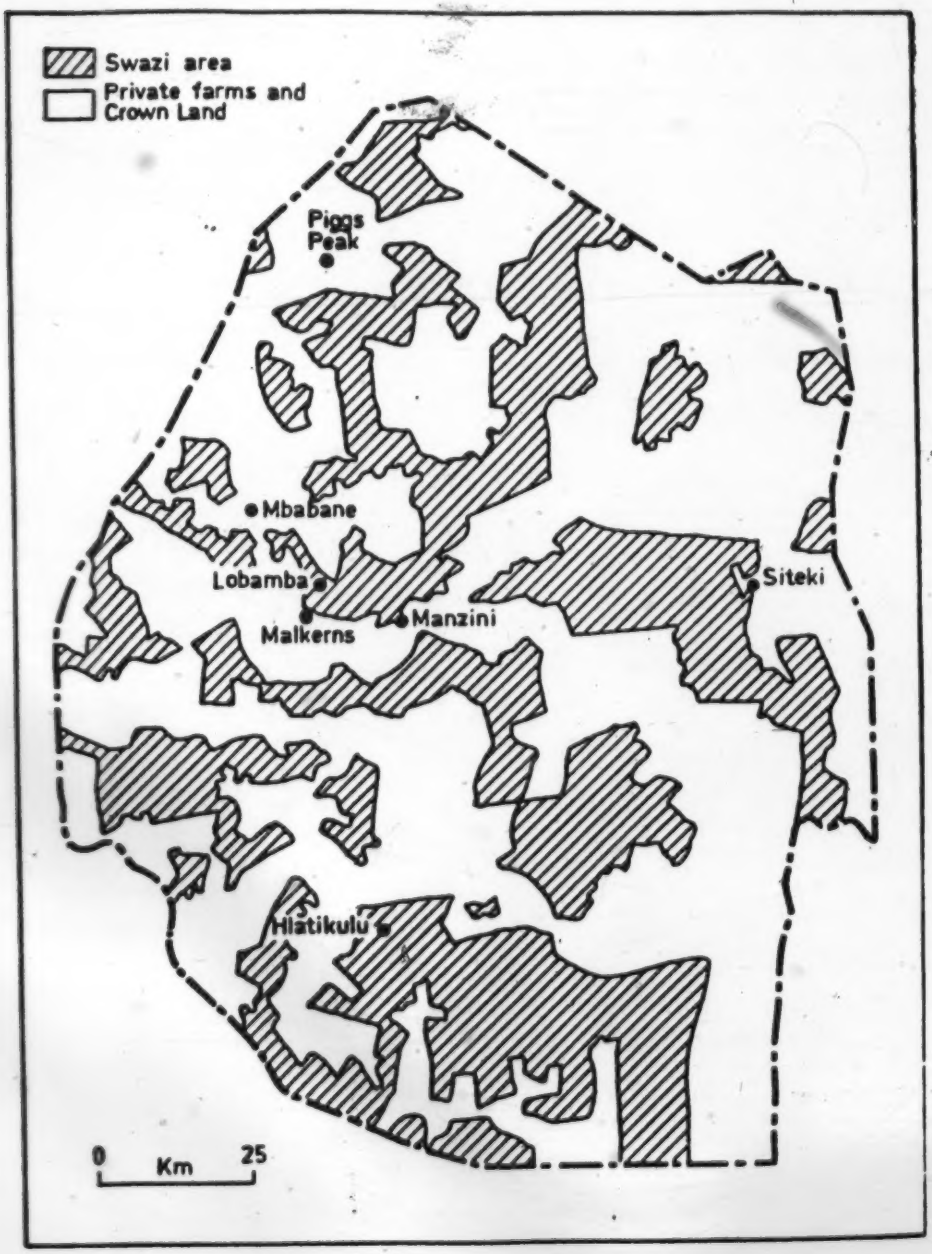
Feelings of SNL Farmers About the Current Level of Maize Prices - 1985.

Feeling	Number	Percentage
Too High	10	16.7
Too Low	24	40.0
Okay	18	30.0
Do Not Know	5	8.3
No Response	3	5.0
Total	60	100.0

SOURCE: Survey Results.

Appendix I

Land Distribution Between SNL and TDL After the 1907 Land Patirtion.



Appendix J

Rural Development Areas in Swaziland - 1981.